DOCUMENT RESUME

ED 157 661 RC 010 635

TITLE	A Review of Current Practices and Trends in Rural Telecommunications Development and Recommendations for Future Development.
INSTITUTION	Booker T. Washington Foundation, Washington, D.C. Communications Resource Center.
SPONS AGENCY	Economic Research Service (DOA), Washington, D.C. Economic Development Div.
PUB DATE	Aug 75
NOTE	108p.
EDRS PRICE	MF-$0.83 HC-$6.01 Plus Postage.
DESCRIPTORS	Agency Role; Community Development; Cost Effectiveness; *Demonstration Projects; Economic Development; Educational Development; Futures (of Society); Health Services; Information Dissemination; *Needs Assessment; *Policy Formation; Quality of Life; Recreation; Research Needs; Rural Areas; *Rural Development; *Surveys; Technological Advancement; *Telecommunication
IDENTIFIERS	*Economic Development Administration

ABSTRACT

Assessing the potential impact of telecommunications technology upon rural economic development, this study for the Economic Development Administration (EDA) employs data assembled and analyzed from the following: "informed experts;" research information and demonstration projects; and federal legislation, research, and agency interests. The intent was to provide information helpful for determining national policy about telecommunications research and development as related to rural areas; up to now, most attention has been on urban areas. The report covers demonstration projects in community, rural business, and economic development; education; health; information dissemination; and entertainment/recreational/cultural programming. The study shows: social and entertainment services have not been subjects of major demonstration programs, cost benefits are largely unexplored due to lack of measurement indicators incorporating quality of life factors, major projects should be regional in scale, importance of software programming is often neglected, effective telecommunications technologies can increase government efficiency, rural residents generally accept new technologies, a paucity of concrete findings exists, telecommunications programs can be comprehensive and pervasive. Recommendations involve legislation, regulation, public/private sector involvement, EDA's role. (RS)

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STATE OF THE ART

A REVIEW OF CURRENT PRACTICES AND TRENDS IN RURAL TELECOMMUNICATIONS DEVELOPMENT AND RECOMMENDATIONS FOR FUTURE DEVELOPMENT

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Prepared By:

The Booker T. Washington Foundation/
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for

The Economic Development Administration
Office of Economic Research
U.S. Department of Commerce

RC 010635

August 1975

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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1.0 OVERVIEW

At the national level, the Federal government is increasingly focusing on service delivery as one of the most promising applications of telecommunications technology. Among the applications already identified are the delivery of educational services, telemedicine and health care applications, localized social service information dissemniation, and direct interaction between municipal government and citizens. Federal departments and agencies, such as Health, Education and Welfare, the National Science Foundation, Housing and Urban Development, Commerce, and the White House Office of Telecommunications Policy are presently developing policy on what role should be played in studying and demonstrating the potential services new communications technology can offer. In addition there has been a concentration on analyzing technical systems capabilities, and examining legislative and regulatory issues that effect the development of cable service in local communities. Up to now, however, most of this attention has been directed toward urban areas. It was rural America that gave birth to the cable television industry, yet, demonstrations have all but forgotten that rural areas have an even greater need for the services cable can provide.

Primarily our goal in this review is to identify various opinions, demonstrations, programs and proposed pilot projects which indicate that telecommunications technology can create significant impacts upon rural living conditions. Hopefully, the review will offer some insights into: (1) the type of potential impacts that telecommunications technology is expected to create in rural areas; (2) the range of present institutional and federal interest and involvement in this area; (3) the major needs

of rural areas; (4) significant pieces of proposed legislation and official federal agency mandates which can influence the implementation of telecommunications in rural areas; (5) the thinking of "informed experts" on the issue of telecommunications' potential impact upon rural development; and (6) tangible recommendations that can possibly accelerate the integration of telecommunications technology into major rural economic development schemes.

This report contains five distinct sections. Section 2.0 is the methodology used for obtaining the necessary information for this preliminary review. Section 3.0 of the report outlines and categorizes the types of responses received from a question-discussion framework used to elicit statements and opinions on the present state-of-the-art of telecommunications and rural development from a number of "informed experts". Section 4.0 describes pertinent telecommunications demonstrations conducted since 1973 which have some relevance to the issues of rural development vis-a-vis telecommunications technology. Section 5.0 discusses the major policy issues to be considered in contemplating the role of telecommunications technology as part of any major rural economic development scheme. Emphasis in this section is placed on a legislative review of proposed bills that may influence rural telecommunications development, identification of federal agency mandates supportive of rural cable development, and a broad consideration of an economic paradigm involving rural economic growth and an export base model applied to the integration of telecommunications technology into the rural sector. Section 6.0 reflects a number of findings and conclusions that were derived from this report. Section 7.0 recommends action

steps that need to be taken regarding Legislation, Regulation, Public/Private sectors, and defines EDA's role in stimulating and accelerating the ultimate ascertainment of the potential impact of telecommunications technology on rural economic development.

2.0 METHODOLOGY

This review was conducted in four phases. Following is a description of the methods used in completing the four phases.

2.1 Bibliography

A preliminary search of the literature pertaining to the relationship between telecommunications technology and socio-economic development of rural areas was performed. The search strategy encompassed a thorough investigation of the standard bibliographical review tools in the social and applied sciences and included:

- Review of specialized collections of area technical information centers and resource libraries;
- Computer search of Ohio State University's Mechanized Information Center data base;
- Review of National Technical Information Service abstract files;
- Complete search of Cablecommunications Resource Center data base;

The bibliographical information was used as a primary data base for the entire review. Major sources of information came from:

- Applied Science and Technology Index
- Biological and Agricultural Index
- Business Periodicals Index
- Cumulative Book Index
- ERIC Educational Document Index
- Library and Information Services Today (LIST)
- Public Affairs Information Service Bulletin
- Readers Guide to Periodical Literature
- Selected Rand Abstracts (Cumulative Edition)

The following specialized area data bases were searched:

- Urban Institute, Library
- Cable Television Information Center, Library
- National Science Foundation, Library
- Community Service Administration, Library
- Office of Telecommunications Policy (White House), Library
- National Institute of Education (ERIC Clearinghouse files)

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PREFACE

For the past two months, the Booker T. Washintgon Foundation/ Cablecommunications Resource Center (BTW/CRC) has been engaged in a preliminary review of the present state-of-the-art of rural telecommunications development, as well as assessing the impact telecommunications technology will or can have on rural development. The review was performed through a contractual agreement with the Office of Economic Research, Economic Development Administration (EDA).

The intent of this report is to provide EDA with working information that should be helpful in determining national policy regarding the future course of telecommunications research and development as related to rural economic development. The reader should be aware of several important factors that provide the context for this study. First, personal consultation with "informed experts" in the field of rural telecommunications development formed an important source of information. Out of a core group of 31 individuals sent questionaires, 18 responded. (A list of individuals is found in Appendix B). Second, various Federal (Office of Telecommunications Policy, Federal Communications Commission, etc.) and state regulatory bodies have encouraged numerous observers (i.e. academic institutions, research corporations, public foundations, citizens groups, etc.) to study and research various aspects of telecommunications utilization, and this has resulted in a significant body of documents and reports. However, the two-months time frame in which this study was conducted, did not allow for an exhaustive examination of such documents. Rather, this report attempts to determine what is particularly pertinent to future EDA involvement and has tried to be as concise as

possible in its descriptive and bibliographical information, so that EDA can quickly grasp a sense of the state-of-the-art of telecommunications and rural development.

The BTW/CRC staff directly involved in the preparation of this report include: Samuel Carradine, Marion Hayes-Hull, William Polk, James Welbourne, Liesel Flashenberg, Eric Stark, Carolyn Vance, Madeleine Simmonds, Barbara Hines, and Carolyn Haynes.

The following subject terms were used for searching through the literature:

- "Communications"; "Community Development"; "Economic development"; "Rural development"; "Technological innovations"; "Technology"; "Telecommunications"; "Television and radio".

Additionally, resource persons in various organizations were contacted to determine the availability of other reports and research studies either in progress or not readily identifiable through the printed literature sources. Such individuals include staff members at:

- George Washington University's Program of Technology Assessment
- National Rural Eelectrical Cooperative Association
- U.S. Congressional Office of Technology Assessment
- National Sharecroppers Fund/Rural Advancement Fund
- Rural Development Service of the U.S. Department of Agriculture

The resource bibliography on "telecommunications and rural development" is divided into five sections (books; articles; reports and studies; government documents; and rural telecommunications support centers). (See Appendix A). With the exception of the "Articles" section, the bibliography has been arranged alphabetically by title followed by journal source, and the "support centers" are listed alphabetically by name of center.

2.2 Contact with Informed Experts

This phase of the review began by defining the term "informed experts". For the purpose of this report, they are recognized persons who are directly involved in the development of telecommunications technology and/or rural development. The criteria for selection of these individuals included their ability to identify, describe and analyze studies, experiments, and demonstrations relating to the economic impact

of telecommunications technology on rural development. (See Appendix B for list of Telecommunications Resource Persons).

A question format was mailed to thirty-one (31) experts on July 10th. The ten questions included in the format were intended to solicit open-ended information pertinent to BTW/CRC in filling the "Knowledge gap" in our bibliographical search. (See Appendix C). Answers to the questions provided a broader base to formulate the critical analysis which was applied to the findings of the review.

All persons were contacted by telephone, and several submitted written responses. Other responses were recorded through taped interviews--many representing the thinking of other close collegues in the telecommunications field.

2.3 Review of Rural Telecommunications Demonstrations

We limited the examination of telecommunications research and demonstration from 1973 to present. The demonstrations were selected in terms of the following:

- o applications of telecommunications technology to rural, remote and depressed areas: (particularly in terms of economic development);
- o telecommunications/transportation substitutability;
- o cost-effectiveness of telecommunications demonstrations in urban areas to rural areas;
- o utilization of interfacing telecommunications technologies.

The resulting data and demonstrations analyzed have been assembled and categorized under the following headings: Health; Education; Community; Rural Business and Economic Development; Information Dissemination; and Entertainment/Recreation/Culture Demonstrations.

2.4 Identification of Policy Issues

In identifying national issues related to rural telecommunications development a review of the overall information base was conducted by principal staff investigators. The purpose of this activity was to determine current policy development and emerging trends.

The federal and legislative analysis phase of this report examined proposed legislation that has potential to support telecommunications and/or cable system development. In addition, it reviews federal research and development activities and federal mandates that are supportive of rural telecommunications development.

In the area of economic analysis, a rural growth model was generated to formulate the basis for (1) conducting an analysis of existing economic theory; (2) establishing the need to develop new measurement instruments; and (3) describing an economic growth sequence that would impact on rural communities if communications development were applied as a method for altering primary economic indicators in the rural sector.

3.0 INTERVIEWS WITH INFORMED EXPERTS

The following discussion summaries represent a synthesis of opinion gathered from recognized persons in the fields of research, engineering, economics, psychology, business development, sociology, and information sciences who have been involved in the development of telecommunications technology and/or rural development for many years. A ten question interview format was mailed to thirty-one "experts" and responses were synthesized from telephone taped interviews, written returned questionaires, and extractions from previously prepared reports cited by the respondents.

The questions were designed to be broad and open-ended to enable the respondents to stress their own major area of activity, and to stimulate the discussion of problems, criticisms, and potential opportunities for advancing the quality of future telecommunications research and rural development strategies. The complete responses are too extensive to report fully here. However, the questions asked and the data from the responses are summarized below.

3.1 Which cable and other telecommunications applications for service delivery seem most appropriate for rural areas? Is there existing experimentation in the field?

The experts approached these questions from the prespective of either software or hardware, with most referring to specific social services that appeared most applicable to rural areas. An intermodel mix showed a combination of service applications that could be used with cable, micro-wave relay, existing broadcasting service, translator systems or power boosted antennas, mini-power transmitters using a network of

video cassettes, narrow band radio, telephone combinations, and satellite in combination with community center receiving stations or cable and/or low power transmitters. Various types of services were discussed as technically feasible for reaching rural residents. The existing experiments using telecommunications applications most prominently mentioned were those in the health and education fields. (See Section 5.0) Those respondents who were directly involved in experimental telecommunications projects, discussed their experience as being initial endeavours, with potentials yet to be realized and cost/benefits yet to be determined. "We just made a needs assessment of social services in 60 agencies within a community, asking what kind of applications or functions that could be provided by telecommunications technology would help them most," said one of the respondents. "We came up with 2-way video from 5 out of 6 agencies...only a few were data returned that would be based on narrow band communications. Yet two-way broad band telecommunications systems are enormously expensive."

Respondents particularly cited the delivery of health services and cultural/entertainment services to rural areas as an extremely viable use of telecommunications technology. One expert replied: "Health is the most crucial. I think the reason is that there is so much public money that's pouring into health service delivery and there is now a sense of comprehensive responsibility...everybody ought to receive adequate health care. With that consciousness there is a necessity for logical pursuit of efficient delivery methods. In the past nobody gave a damn about people who didn't seek health care for themselves and those who couldn't afford it. Now it is becoming right for everybody and a governmental responsibility. Under these circumstances

there must be experimentation with finding ways to deliver quality service economically."

3.2 Which rural development schemes appear to lend themselves most viably to telecommunications?

This question elicited a general consensus that telecommunications is desirable and necessary to comprehensive rural development, both economically and socially. However, the question in the minds of most of the respondents was: "Who will finance the adaptibility of community development schemes to telecommunications experimentation?" Many respondents suggested regional or state commissions be established primarily to study the link between rural development and demonstrations of new telecommunications technology. "Regional commissions can get the money.. they really can. When you think of the Appalachian Commission, the Commissioners are the Governors of 13 of the most important states in the U.S. These people have the clout and if they base their plea on economic necessity plus certain high social priorities, I think they can get it. So I want to suggest that this is basically a big game and it should be played by big players...and regional commissions offer a marvelous channel. Where they don't exist...there are various reasons... for example, most of the things we're concerned about don't respect state boundaries. For example, New England has a regional commission, Appalachia has a regional commission...I'm not informed of the situation in the West, but if they don't exist, they ought to exist. I would push in that direction...for the creation of these kinds of structures...just in the power game because they can play the game of power." Also on the question of organizational schemes for rural telecommunications development, the respondents discussed a variety of options. They included

new towns, cooperatives, local development activities and telecommunications experimentation. The respondents particularly stressed the planned rural communities" or "new towns" concept rather than applications to existing rural communities as lending themselves most viably to telecommunications. However, the importance of telecommunications to positive rural development was acknowledged by virtually every respondent. Most of the interests reflected the background of the respondents which in most instances focused on health and educational services, with some emphasis on business and economy.

3.3 Are there regional or geographical distinctions which might influence the use of telecommunications in rural development?

Respondents to this question did not differ widely in their opinion. Several stated that differences in geographic terrain would vary the economic considerations, however, there is little that can be pinpointed to make a case for major regional differences: "The education and cultural sophistication of the rural residents could influence the rate at which they accept and adopt the new technology (e.g. a rural Connecticut resident might be more likely to participate in a telecommunications experiment than a rural Mississippi resident)." Another respondent particularly addressed the question in terms of satellite technology. He stated: "In satellites the regional and geographical distinctions disappear from an orbit of 22,000 miles over the earth. Political boundaries become invisible. With satellite communications, audiences can be aggregated from wide geographic distances. For example, using urban areas as a point of reference, big city schools, in places like Detroit, Washington and New York, have many common problems for which

they are seeking solutions. Their nearest geographic neighbors however, are well-to-do suburban districts such as Montgomery County, Md., Greatneck, L.I., and Grosse Pointe, Michigan. By the same token, those schools with high academic orientation have commonalities of interests but are widely scattered from each other. The same would hold true for agricultural or medical problems in various rural areas. The satellite is a way to hook all of these common interest groups together on a cost-effective basis, in spite of geographic distances from one another."

Some expressed an opinion which indicated another trend of thought focusing on the differences between geographic distances rather than demographics and population density in regard to telecommunications development. These respondents brought out the economic reality of higher density population areas as better able to support telecommunications systems, particularly coaxial cable systems.

3.4 What method of capital and other resource infusion would most facilitate development of rural telecommunications as an economic impetus?

All experts who responded to this question agreed that the key to the ability to deliver improved telecommunications services to rural areas is financing and that some method of government participation is necessary, whether through subcontracts, susidy, or public/private combination. Some of the methods discussed were: "Open market competition by private enterprise with a specially created government funding and planning agency (similar in some respects to the Tennessee Valley Authority) to contract work on the project out to various private subcontractors." There is a Rural Electrification Association that has ample authority right now to make loans at low interest rates to the cooperatives

that are engaged in delivering public service to rural areas. However, many cable systems still administratively find it difficult to borrow REA money for community antenna television systems. "Conceivably you could design your system so that those signals that don't go over the air but deliver services to schools via closed circuit could be paid for by an REA loan." "The Tennessee Valley Authority type of regional consortium that would pool the local community support of its own telecommunications development seems feasible to attract investment." " A Public Service Satellite Consortium is now being put together which represents the interests of many broadly based public groups who want to provide very low cost, efficient communications services to people who can't affort the existing commercial domestic satellite systems, but are interested in non-switch telecommunications service development." "I think the key is comprehensive economic development schemes. One venture being studied is tourism in Appalachia and it's clear, that strengthening this industry could help to strengthen rural economy of Appalachia. Video can be used to record the existing culture of the region and disseminate cultural understanding and travel interest to people in other parts of the country." "We, (a federal agency)are looking for ways to help the states think in terms of social services being delivered a new way - in video - but still spending the same service dollars. We are assisting in determining the cost-effectiveness and identifying hardware and software resources." While experts were seeking innovative combinations of funding sources, all mentioned the necessity for a cooperative effort by local community, private enterprise and government.

3.5 <u>What provisions, if any, should be made for subsidizing the costs for utilization of telecommunications technology in rural areas</u>?

The experts mentioned subsidy for social services, tax reductions on earnings made from work on rural telecommunications projects, special low interest long term loans, and state and federal government matching fund programs for research. Again, the respondents stressed a cooperative effort: "The development of rural telecommunications systems should never be talked about apart from the concept of regional economic development and should be seen as priming the pump. I see no reasonable hope that the states or the counties could develop them alone."

3.6. From your investigation into telecommunications technology for rural development, which telecommunications technologies seem most cost-effective?

Direct-to-the-home broadcast satellite and cable were mentioned most often in offering the most cost-effective technologies for the future. Fairchild Space Systems is working on an antenna that could fit on a rooftop and receive direct broadcasting from satellites. "The most significant thing about satellite communications is that it is not cost-sensitive to distance. Almost any other kind of communications technology that we've had, we've paid for by the mile - whether micro-wave or telephone - but because the cost of delivering satellites into Alaska is exactly the same as delivering it into Bethesda, Maryland, for the first time we're able to provide services in rural areas which were simply economically impossible before."

The respondents discussed a range of combinations, including telephone, narrow band communications, micro-wave, and existing broadcasting. CATV was most often mentioned as a means to fill the need for distribution systems. "I think a proper subject of further study should

be based upon the fact that rural areas are not receiving good health and education services today, and the question of cost-effectiveness is difficult to assess because those few experiments in rural areas that are being conducted have not yielded any conclusions as yet." "Those that were successfully conducted in the eyes of the community (such as some of the Mount Sinai telemedicine experiments and some of the satellite projects did not build in funding for continuity.

3.7 What kinds of impacts do you feel telecommunications technology will have on rural areas?

This question prompted notes of caution from the respondents. Most wanted to avoid discussing telecommunications solutions as a panacea for solutions to rural problems. The use of television, especially cable television, was thought by the experts to be underestimated as a device for entertainment and cultural exchange. "Historically, rural areas have been isolated from the cultural mainstream and television clearly breaks that down - whether it be "Sesame Street", "Kojak" or Walter Cronkite and regardless of one's values, as to whether this is good or bad, it surely happens."

The greatest impact seen by some experts was in the area of improved local citizen involvement. To be able to participate in the decision-making of community economic development seems to be a greater need in rural areas as compared to the urban. "Such involvement would eliminate a major disparity and might therefore have some (probably marginal) effect in reducing out-migration to urban areas." "Cable television in particular, by offering the possibility of local access, seems likely to be able to serve as an important system which carries

most information on how the local society operates, and it is notoriously hard for the newcomer to tap into the system. Further, the new country dweller may be ignorant of a lot of 'how to' points - how to deal with tomato worms, a septic system or an emergency - and may suspect (perhaps rightly) that exposing his ignorance would simply slow his acceptance into the local social structure. For these people, television could be an important tool for socializing into the local culture."

"Telecommunications offers a real possibility of reversing the trend towards urban life...the cities have bottomed out and we've gone as far as we can go with gathering people together. The last reason for cities now is for information exchange...people live and work here because you can have lunch with or make a local call to a contact to find out the inside story on such and such an agency...but now we can transport the information around as easily as we transport power around for aluminum refining." "Telecommunications can have a great impact on the dispersion of population concentrations."

3.8 How should such impacts be measured, over what time-frame?

Most of the respondents were undecided how the impact should be measured. Some suggestions however, were by the service to be delivered, the technologies to be used, the characteristics of the population before the introduction of the innovation, in order to get a correct picture of the impact. "Develop a program in a particular rural area and have experiments going on simultaneously. Begin by tallying all the ways in which public monies are going into a particular rural area and try to develop justification for performing those functions via communications systems and then go ahead and do them. Then you can begin to find out how the trade-offs and efficiencies balance out with each other. If we

take that type of approach, combined with financing experimentation, we may begin to get a feeling for the feasibility for getting started with using communications in rural areas." The experts were hesitant to suggest a firm period of time for measuring the impact of telecommunications experiments, but critical of the tendency for short-sightedness: "Congress gets elected every two years and this has temendous impact on the government's desire for quick, noticable, obvious and easily describable results. I'd like to see us say to Congress: We know you get elected every two years, but unfortunately that's not the time frame for the solution of problems."

3.9 What approaches to long-range planning would you suggest for rural economic development utilizing telecommunications?

A variety of factors were stressed as important elements to long-range planning. Among the suggestions were: long-range planning at the local level, continuous adoption of new technology, regional commissions, and federal assistance. "We need a different structure for planning that is insulated from the vagaries of elections - even the heads of regional commissions are governors with a turnover every four years. A long range plan requires planners with seven year terms...maybe we need to structure semi-autonomous, long range planning staffs for the type of comprehensive integrated systems plan that investment in telecommunications will require." "Monitoring, revising, and timing are critical to the long range planning process." "Rural areas deal with seasons which don't necessarily require instantaneous communications. Problems take months to develop (i.e. a drought does not happen over-night and nature does not deal in instant solutions)." "The long range plan which makes the most sense, is the one that begins by going into an area with

the rural electric people, assessing the needs and wants of that community and then designing a telecommunications package that meets those needs and wants."

3.10. From your experience what has been the reaction of rural residents to the application of telecommunications technology?

A majority of the respondents agreed there had been positive response from the residents. Those rural residents who could afford to pay for the services of new technologies such as the telephone and electricity have tended to gradually adopt them, first as luxuries and now as necessities. One expert said: "My travels through the backwoods of North Carolina revealed that everybody had a telephone and spent their time watching television and the impacts of these technologies on their lives is obvious." The ATS-6 health experiment in Alaska also very clearly demonstrated a favorable reaction from the people there. "Now that the experiment is over, and they no longer have the kind of access to medical service they once had, they are painfully aware of the impact and would very much like to have it back." "People have adapted very readily to having a satellite antenna in their back yard. It appears to be the programming that counts. If the programming is meaningful people seem to forget quickly about whether it comes from a cable or satellite... especially if the human engineering makes it possible to work the technology without a lot of maintenance."

TELECOMMUNICATIONS INTERVIEWS

NUMBER OF QUESTIONS FORMAT SENT: 31

NUMBER OF PERSONS RESPONDING: 18

QUESTION	POSSIBLE ANSWERS	NUMBER of RESPONDENTS		NUMBER not RESPONDING
*1a. Which cable and other telecommunications applications for service delivery seem most appropriate for rural areas?	Information Dissemination/Retrieval	6	.16%	1 03%
	Health Care	9	.24	
	Cultural/Entertainment	9	.24	Total Responses:
1b. (See demonstration section)	Social Service	5	.13	
	Education	4	.11	
	Aged	2	.05	
	Technological Development	2	.05	
				2 .11%
2. Which rural development schemes appear to lend themselves most viably to telecommunications?	New Town	1	.06	
	Regional Commissions/Consortium	3	.17	
	Federal Government activities	1	.06	Total = 18
	Cooperatives	3	.17	
	Cost-efficiency demonstrations	3	.17	
	Economic Development	1	.06	
	Local Development Activities	1	.06	
	Satellites/Cable and other technical experimentation	3	.17	
		5	.28%	2 .11%
3. Are there regional or geographical distinctions which migh influence the use of telecommunications in rural development?	No	9	.50	
	Yes	2	.11	Total = 18
	Not sure			
		4	.22%	4 .22%
4. What method of capital and other resource infusion would most facilitate development of rural telecommunications as an economic impetus?	Low interest loans	2	.11	
	Government subcontracts	1	.06	
	Subsidy	4	.22	Total = 18
	Public/Private combination	2	.11	
	Government Grants	1	.06	
	Not sure			

*Some respondents listed a number of different applications.

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	QUESTIONS	POSSIBLE ANSWERS	NUMBER of RESPONDENTS		NUMBER not RESPONDING	
5.	What provisions, if any, should be made for subsidizing the cost for utilization of telecommunications technology in rural areas?	Subsidy for social service delivery	4	.22	7	.39
			4	.22		
		Subsidy for research	1	.06	Total = 18	
		Tax breaks	1	.06		
		Long term loans	1	.06		
		None				
6.	From your investigation into telecommunications technology for rural development, which telecommunications technologies seem most cost-effective?	Telephone	2	.11	2	.11
		Narrow Band Communication	1	.06		
		Not sure	5	.28		
		Satellites	3	.17	Total = 18	
		Cable	3	.17		
		Microwave	1	.06		
		Existing broadcasting	1	.06		
7.	What kinds of impacts do you feel telecommunications technology will have on rural areas?	Local involvement	5	.28	1	.06
		Improved health care	3	.17		
		Not measurable	2	.11		
		Less isolation	1	.06	Total = 18	
		Urban migration to rural areas	4	.22		
		Negative	2	.11		
					4	.22
8a.	How should such impact be measured?					
		Not sure	6	.33		
		Depends on nature of service	3	.17		
		Survey	2	.11	Total = 18	
		With caution	1	.06		
		Experimental	1	.11		
8b.	Over what time-frame?	Not sure	4	.22	4	.22
		Depends on nature of service	2	.11		
		1 - 5 years	6	.33		
		5 - 10 years	1	.06	Total = 18	
		10 - 20 years				

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	QUESTIONS	POSSIBLE ANSWERS	NUMBER of RESPONDENTS		NUMBER not RESPONDING
9.	What approaches to long-range planning would you suggest for rural economic development utilizing telecommunications?	Long-range planning at local level	3	.17	8 .44
		Well defined objectives and plan	2	.11	
		Continuous adoption of new technology	3	.17	Total = 18
		Regional Commissions	1	.06	
		Federal assistance	1	.06	
10.	From your experience what has been the reaction of rural residents to the application of telecommunication technology?	Positive	10	.56	0
		Not sure	2	.11	
		Gradual acceptance	4	.22	Total = 18
		Neutral	2	.11	

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4.0 REVIEW OF RELEVANT DEMONSTRATION ACTIVITIES

4.1 Community, Rural Business and Economic Development

A number of studies have encouraged the use of telecommunications to improve the quality of life in urban areas, but little has been done regarding the transferability of these applications to rural areas. This is particularly ironic, since it is in rural America that many of the potential benefits of cable could be most fully realized and the high public promise of this new technology most clearly demonstrated. Rural America clearly needs the special services and advantages that telecommunications can provide.

In point of fact, it has been well documented that the shrinking population, as well as a limited economic base has left rural governments with insufficient resources to either develop the infrastructure necessary for industrial development, or to provide the public services that vitally affect rural residents' quality of life. Thus meager services must be provided based on declining revenues to populations that disproportionately need public services such as food stamps, Social Security and unemployment compensation. "Despite the fact that almost two-thirds of the American population live in urban areas almost 50% of those below the poverty level are in rural areas. One in six (17.7%) in America is below that income level, compared to one in ten in the metropolitan areas."* "Yet less is spent on public school education per student in rural America; less is spent by local governments per capita for welfare, health and

* Committee on Government Operations, U.S. Congress, The Economic and Social Condition of Rural America in the 1970's, Part I, 92d, Congress, 1st Session, May 1971, p. 49.

hospitals and all other major services except roads, and less is expended per capita by the federal government."**

From all available evidence ranging from census tract data on rural out-migration trends and the geographic maldistribution of doctors to the Office of Telecommunications Policy Federal reports on the high percentage of rural homes not receiving adequate TV service (1.2 million households presently have no acceptable television signals at all, 6 million households receive fewer than five TV channels), it is obvious that rural communications needs and opportunities are so significant that they warrant priority attention from public agencies.

Yet, this reality has only prompted a small number of agencies to investigate the potential of telecommunications technology in rural areas and to invest the resources necessary for its development.

In this section, several exemplary telecommunications demonstrations in the areas of community and economic development are described in detail. In addition, there are descriptions of two previously proposed areas of involvement (Broadband Communications Distribution System and the Pennsylvania Rural Electric Association Project) which, although not currently funded, provide some interesting insights into possibilities for rural development impact.

** Committee on Government Operations, U.S. Congress, The Economic and Social Condition of Rural America in the 1970's: The Distribution of Federal Outlays among U.S. Counties, Part 3, 92d Congress, 1st Session, December 1971, p. 16.

4.1.1. New Rural Society

The Windham region of Connecticut is the test site for the first study of its kind in the nation to seek ways and means of correcting population imbalance between urban and rural areas. Ten Windham townships occupy about 326 square miles, with the western border some 25 miles from Hartford. Only five per cent of the land is urban. Thirteen per cent is agricultural. The remaining 82% is underdeveloped. The study, conducted under a $362,000 HUD-funded contract with Fairfield University, is directed by Dr. Peter C. Goldmark, President and Director of Research for Goldmark Communications Corporation of Stanford, a subsidiary of Warner Communications, Inc. (Warner Communications is the second largest Multiple Systems Cable Operation in the country).

Dr. Goldmark is recognized as one of the nation's leading authorities on the technology of communications. Holder of some 160 patents, he created the long-playing phonograph record, the first practical color television system, Electroic Video Recording (EVR) , and he has made numerous other contributions to communications techniques, notably in the Lunar Orbiter program.

Dr. Goldmark's project is concerned with investigating the role communications systems can play in building what he terms a "New Rural Society". His main thesis is that in order to offset the current trend towards high density urban living, a national effort should be launched to encourage growth in smaller communities in the United States. His extended line of thought postulates that since people usually migrate to places which offer the best employment opportunities and living environment, and business and industry also seek areas where a suitable work force is available, two things must happen: First, state and regional

planning offices must pinpoint small communities according to the availability of space, utilities and other local services where business and population growth can be carefully planned to insure the desired quality of life. Second, the operation of business, education, and government, as well as the means to provide for health care and culture, must be analyzed. The objective is to apply the proper communications systems to these functions to permit business and government to move to attractive rural areas while maintaining effective interaction between their widely separated offices.

The maldistribution of our national population has been well reported in contemporary research. Large metropolitan urban and suburban concentrations account for 85 percent of the nation's population living on less than 10 percent of our land. Furthermore, it has been estimated that at the current rate, two thirds of the people in the United States by the year 2000 will live in 12 urban centers. The critical question raised by this stark reality is: Why do people migrate from rural areas and why don't urban residents move there? A National Academy of Engineering panel found some of the main reasons to be: lack of suitable educational and health services and a lack of social, cultural and recreational pursuits in present rural areas.

Dr. Goldmark, has suggested that communications technology can improve conditions considerably, but adds the caveat that new approaches must be sought. Some of these new approaches are being sought within his New Rural Society pursuits.

The various research pursuits that have been developed under the New Rural Society Project since its inception on 1972 can be categorized under three specific categories:

- o Community and Communications
- o Business and Government Communications Studies Decentralization and Office
- o Experiments and Field Test Communications Systems

For the purpose of this review, the first two categories of the NRS are of greatest importance. In order to be as succinct as possible, one representative example has been drawn from each of the two categories for discussion.

> (For the sake of comprehensiveness the abstracts indicating the major findings of all three sections of NRS research thus far undertaken and describing reports which can be obtained on the New Rural Society project have been included in the appendix. See Appendix D for abstracts of "The New Rural Society Project Report").

The Community and Communications efforts of the NRS project involved a number of interviews and surveys of different small town residents on various issues. The most interesting of the seven different studies performed was the Windham Region Quality of Life Survey. This study consisted of interviews with a population sample of 500 persons selected to be geographically representative of the ten towns in the Windham Region. The same survey questions were also given to a sample of 52 individuals judged by their employers to be "advanceable" types. The reactions of this group were compared to those of the general population to determine in what ways this industrial sample differed from the "general" population.

The study sought to determine the mobility of the population attitudes toward living in the region, and the effect of age, income, educational level, etc., on these factors. In addition to the above, the survey recognized the special role that communications play in the NRS project and thus, the attention of the sample population to the

consumer media such as newspapers, magazines, books, radio, and TV was studied. It sought to identify significant differences between the "general" population and the "advanceables".

The following were among the important findings:

- 46% of the general population (G.P.) respondents and slightly more than half (52%) of the respondents in the industrial sample had moved to their present residence within the past ten years.

- Given a choice unconstrained by family or economic pressures, 69% of the G.P. respondents and 63% of the "advanceables" would like to remain in the Windham region.

- The top four qualities in living environment desired by the G.P. respondents are to enjoy nature (83%), to live near people they feel "comfortable" with (80%), to have privacy and be left alone (80%) and to feel safe when walking around (69%). The four qualities considered of least importance were to have an opportunity to make more money (34%), to be in more exciting surroundings (32%), to enjoy good restaurants (29%) and to have convenient public transportation (17%).

Another concern of the NRS project is the determination of the ways to provide an adequate number and choice of employment opportunities in rural towns. Under the title Business and Government Decentralization and Office Communications, six different studies have been performed in an effort to explore ways to make it attractive for business and government operations to expand into rural parts of the country. Analysis of internal and external office communications are an important ingredient of these investigations. NRS is exploring techniques through its office communications analysis to facilitate the applications of existing communications technology to the decentralization and relocation of business and government operations. The intent is to characterize the communications needs of an organization, such as meetings, correspondence, telephone contacts, etc. These data, along with an understanding of how long distance electronic

those communities by using cable television and related telecommunications systems to improve and expand community facilities and services in the areas of education, health, recreation and social services.

The National Rural Cable Development Task Force (NRCDTF) was formed out of two major realizations: (1) that rural communications needs and opportunities are so significant, as evidenced by the data collection*, that they warrant priority attention from public agencies and (2) a number of federal agencies presently exist that have the funding programs and the legislative mandates to support cable television business development.

Thus in reaction to these stark realities, CRC has devised a broad-based program focused on developing cable systems in some 105 "cable ready" rural communities in 18 different states. These areas were identified over a four-month period; selection criteria included the presence of a significant minority population, a predominance of minority elected officials and weak broadcast signal reception. The first phase of the program focuses on 42 of the 105 cities identified as "cable ready" and will influence at least one million rural residents in seven states: New Mexico,

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* For instance, according to recent census tract data, rural areas lack adequate educational and health facilities. In fact, a recent issue of "Nation's Business" states that at least 132 rural counties, with a combined population of 472,000 have no doctors at all. Additionally, field research performed in Louisiana by the Cablecommunications Resource Center reveals that inhabitants of many small towns must drive 30-40 miles to obtain emergency medical service. One can easily realize that such a reality not only seriously jeapardizes lives, but also, over time, creates significant cost for individuals who need follow-up medical treatment. Furthermore, rural areas have limited recreational opportunities. Most small towns have only one drive-in or motion picture theatre as the major center of attraction outside of the home television set for leisure time activity. Thus as the mass medium, the home television set reigns supreme as the chief recreational diversion most utilized by the majority of residents regardless of sex, age, race and socio-economic status.

Louisiana,Texas,South Carolina, Arizona,Mississippi, and Florida. A number of cable groups have been organized and are moving toward incorporation in several states, while in seven states cable franchises have actually been won in selected cable ready areas. (Espanola, New Mexico; Roosevelt, Alabama and Grambling, Louisiana.) Various members of the consortium of local economic development organizations making up the Task Force have played key roles in the acquisition of these franchises.

The various federal representatives of the National Rural Cable Development Task Force in an effort to consummate formally their commitment to this important effort have all recently signed a written Task Force agreement which outlines the individual and cooperative responsibilities of all those involved in this undertaking. The EDA was a lead-off signatory of this document. (See Appendix E).

4.1.3. Dayton Manpower Project

Human resource development and career training is an integral component of rural economic development programs that are comprehensive in scope. A demonstration program under the Comprehensive Employment and Training Act to train minorities and other disadvantaged workers for jobs and career occupations in the cable industry was funded in July 1975 for the Dayton, Ohio area. The program will train approximately 80-200 unemployed and underemployed residents from the Dayton region for jobs in all aspects of cable television ownership, construction, management, operation and programming.

Designed and coordinated by the Cablecommunications Resource Center, the project encompasses a larger goal of establishing Dayton as a model cable training center which will demonstrate the feasibility of generating similar

manpower programs in other areas of the country. Accordingly, the National Cable Television Association and an Advisory Council of government policy-makers and varied consulting experts provide support mechanisms to ensure success for the program goals and ease the way for replication in other areas. The job training is being conducted in 26-week components over a two-year period for jobs and career development that can lead to an Associate Degree.

Permanent jobs in the industry have been guaranteed by establishing a cooperating relationship with potential employers who will assist in tailoring training to meet their specific business needs. Trainees receive a weekly stipend as provided under the Department of Labor's Comprehensive Employment and Training Act. The Dayton-Miami Valley Manpower Consortium through the Dayton Board of Education are local program sponsors. CRC administers the program through a regional program office, while the National Cable Television Association provides continuous industry manpower forecasts, job development, job placement, and training equipment. The regional management approach is designed to enable a comprehensive review of the program and the cable industry throughout the State of Ohio, which currently operates 137 cable television systems and has 96 franchises for new systems several of which are located in other rural areas where cable industry expansion activity is planned.

4.1.4. Western Wisconsin Communications Cooperative

In rural Wisconsin, a consortium of 23 Trempealeau County cooperatives and seven schools has formed the Western Wisconsin Communications Cooperative to bring the full potential of cable communications to this farmhouse community and every one of the county's other 9,500 homes. The communications cooperative is the nation's first county-wide, area coverage, viewer-owned

cable system. Its goal is to provide access to a 30-channel system interconnecting the schools, hospitals, businesses and homes of the county's 25,000 people.

The five-year communications project will cost $5 million and will be completed in three phases. Phase I will provide a 75-mile loop of coaxial cable service to intertie the county's eight towns and seven schools. A second phase would wire the smaller villages and the final phase would extend cable to all the farms and rural homes.

A communications center built in a centrally located town in the county would house studios and video equipment. But each school would serve as a mini-communications center to originate programming and act as a hub for feeding cable coverage to surrounding rural areas. The co-op subscription charge will be $5 per month, with an extra charge for experimental services. The co-op would be a cable system of, by and for the people and through cooperative ownership, people would be encouraged to participate in cable decisions and policies.

The new cooperative plans to go beyond the usual CATV pattern. Most cable systems are little more than community antenna services, importing a few clear channels to subscribers. However, Western Wisconsin Communications Co-op plans on delivering the full potential of cable communications to its viewer members. Proposed programming would include: local cablecasting of area sports, city/county government, co-op meetings, a complete educational network, access to health care on two-way cable, fire and burglar alarm systems, FM radio signals, computer access for businesses and a score of other public services.

The new co-op is currently offering for sale preferred equity certificates to its members to raise working capital. The Cooperative has

received a $1,238,000 loan commitment from the Farmer's Home Administration (FHA), pending arbitration of some basic loan requirements. The cooperative model is one of the few ways to bring cable communications to the rural people of Trempealeau County. No private cable company would use the "area coverage" principle to include rural people in future cable expansion. Current legislation before the Wisconsin State Assembly calls for provisions to allow intercommunity cable districts to organize and float municipal bond issues to raise funds for intercommunity cable systems. Although narrowly defeated in a special legislative session, the bill will be reintroduced in the next regular sesssion. Its chances are considered good.

Gordon Meistad, manager of Trempealeau Electric Cooperative, and the catalyst of WWCC's formation, has strong views about the importance of cable to the people in his county. "I'm not interested in cable just to get a few commercial channels," he said. "We're planning on building a total system to serve the future communications needs of every resident of the county. The real goal of the communications cooperative is to upgrade the quality of life for our rural members." Meistad believes that cable may be more significant for the rural, rather than the urban population. "It can, if developed to its full potential, revitalize rural life, and help keep young people in rural areas by creating jobs and offering some of the social, cultural and economic advantages of the major cities."

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* Rural Electrification, May 1974, No. 8 p. 16

4.1.5. Broadband Communications Distribution System

Other than the previously cited examples, very few significant telecommunication demonstration projects involving an attempt to impact upon rural economic and community development needs can be found in past literature or in recent operation. In terms of rural areas, much more has been proposed than actually carried out. For example in 1971, Malarkey, Taylor and Associates prepared a lengthy report on suggested Pilot Projects for a Broadband Communications Distribution System for the White House Office of Telecommunications Policy. The impetus for this report stemmed from OTP's desire to consider the feasibility of a major telecommunications pilot program to determine the usefulness and economic viability of wide band distribution facilities in alleviating some urgent problems of today's society.

In their report, Malarkey, Taylor and Associates assembled a comprehensive listing from a literature search and other sources of telecommunications projects and experiments, planned or in progress. Out of this 500-page report, only 18 pages were devoted to the issue of the extension of Broadband Communication Networks (BCN) to small towns and rural areas. The major purpose of this section of the report was to define the problem of rural television service and suggest solutions. One of the report's conclusions was that "so long as opportunity exists at lower risk, venture capital will tend to be channeled to urban rather than small town or rural development, as it was in the case of rural electric power and rural telephone. The report recommends that an investigation be made into the feasibility of long-term (30 years) low interest (2%) capital loans, with federal guarantee, for construction of BCN in small towns and rural areas

(under 10,000 population outside urbanized areas); and if appropriate, seek the necessary enabling legislation. The MTA report concludes that the federal government could greatly accelerate the understanding of BCN operations and capabilities by stimulating the creation of a test-bed with the necessary technical facilities in which a wide range of services could be realistically examined for their (1) economic viability, (2) usefulness as a communications link for dealing with social problems, (3) increasing the efficiency of government and (4) improving the quality of life.

4.1.5. Pennsylvania Rural Electric Association Project

In 1973 a pilot Rural Telecommunications Program was proposed by the Pennsylvania Rural Electric Association with the assistance of Batelle Memorial Institute. This pilot project is significant for review, first for its ambitious intent and second for its failure to receive funding. The project personifies the basic plight facing rural areas -- a disproportionate amount of time and innovative energy is spent proposing programs rather than conducting actual demonstrations.

The Rural Community Development Demonstration proposed by the Pennsylvania Rural Electric Association and Batelle Memorial Institute focused on the enhancement of a rural environment in Harrisburg, Pennsylvania encomposing one of five possible counties (Adams, Crawford, Franklin, Huntingdon and Tioga) through the application of telecommunications services. The specific goal of the proposed project was to test and evaluate the feasibility of the institution of innovative economic development activities vis-a-vis the use of telecommunications technology in the delivery of a variety of programs and services to meet social and cultural needs and demands of the rural inhabitants. The proposal for the project was initially submitted to the U. S. Department of Agriculture (Assistant Secretary for Rural Development) and to the various Operational Departments of the State

of Pennsylvania.

The project's major premise is that in order for a telecommunications program to fully affect the total development of a rural area, it must be based on a three-element approach involving economic, social and cultural applications of telecommunications technology. According to the proposal, the first element in the economic base is derived from the potential for expanded employment opportunities made possible by what they term Integrated Diversified Manufacturing Units. This concept envisions the utilization of existing techniques for numerical control of manufacturing machinery -- brought together by a diversified telecommunications network in a cluster in the rural area. The remote manufacturing sub-unit, each employing 50 to 150 rural residents, might make piece-parts or electronic sub-assemblies . . . a small manufacturing facility that fits without disruption into the rural environment. These diversified manufacturing units could be considered latter-day "cottage industries"; once an essential part of the rural economy.

Each unit would be equipped with a number of machines fed by digital instructions from a mini-computer located in the plant. Each machine's electronic input is a digital signal, fed to the controlling mini-computer over high-quality narrowband telecommunications lines. Two-way visual communication could be brought in on wideband coaxial cable to make it possible for machine operators to view video instructions (live or recorded) sent from the central processing location. Training material, recorded on-site from live sessions or from prepared cassettes, could be viewed and reviewed as many times as necessary -- at the convenience of the operator.

With the introduction of somewhat broader educational material, the Diversified Manufacturing Cluster could become a specialized vocational training center. The rural telecommunications network facility could distribute, in either direction, management information such as inventory control

data, order processing, and payroll information. They believe that a great many such innovations could be developed, providing a new element for employment without the adverse elements of larger industrial complexes.

Other services might be brought in to enhance the rural economy, such as, state or county government operations which do not require face-to-face contact. Work, such as keypunching, reporting, record keeping could be done in the rural area and the output sent back to the State Capitol or wherever needed over telecommunications facilities. As the economic base in the rural area is broadened, then support services needed by the inhabitants will be attracted, adding further to the economic base.

At the same time that the Diversified Manufacturing Units are being set up, along with the other support services, the cable television portion of the system, supplying its traditional service, would be put into operation, owned by a cooperative. This would provide early cash flow and a modest employment potential for the area. The main factor is that a significant part of the telecommunications plant facilities could be on a partially self-sustaining basis, early-on in the project.

With respect to the social element of this project, their proposal states: "If we can improve the economic foundation of the rural areas, this would be a significant contribution, but one also must consider the social service facilities that are needed and desired in order to assure that those who earn in the rural area spend what they earn in the same area. There isn't much gained if the wages earned in the rural area are taken out and spent in the nearest large city. The rural inhabitant must be able to receive such social services as education and medical care that he and his family

need. These services must be added to the economic base. He has to know that he can, if he chooses, continue his education or maintain his skill level or train for a new vocation while he is still in the rural surroundings. But especially, he wants to be assured that his children will have a chance at a good education."*

The report projects that wideband telecommunications has the potential of delivering medical services such as remote on-line diagnostic screening and other services which could alleviate the problem of chronic shortage of physicians serving rural areas. Telecommunications has the potential to improve the quality of pre-school, elementary, and secondary education by expanding the learning resources available to schools through remote data sources such as public and special libraries. Vocational education programs can be more effectively disseminated. In some areas, Educational Television (ETV programming) not available on broadcast television service can be brought to the rural school system via the cable. Lectures, utilizing experts in specific fields, could be made available in cassette form to be viewed at the convenience of the teachers or the students. Documentary cassettes could be used to enrich the library resources of the existing education system.**

"Placing these added services at the disposal of rural school systems may be a more cost effective way of improving the systems thus helping to create a climate that will help to encourage the rural inhabitant to stay where he is. It is apparent that many of the ex-rural people now in urban environments would like very much to get back to the rural environment -- if

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* Batelle Columbia Laboratories, Preliminary Proposal for a Cable Communications Pilot Program, January, 1972, p. 15

** Batelle, Ibid p. 15

only they could afford to do so! They left the unstable economic climate of the rural area where there currently isn't much money to improve educational resources and went to the city to find that they were not able to earn enough to increase their standard of living. They end up, in a real sense, in no better and in many times, worse condition, in terms of their needs and desires." *

Finally, the cultural environment is the third element of immediate concern to the telecommunications project. According to the proposal, this area involves, in addition to the "arts" and entertainment program material, the use of telecommunications for "community development and identity," that is, "helping to create a community of which you are a part, in which you can know people, in which you can work collectively to accomplish things that will make the community prosper in the socio-cultural sense. This same telecommunications system could provide the means for community inter-communication. The existing communications system does not adequately respond to this need . . . this type of system may make it more economically feasible for this intercommunication among communities to take place."**

"If it is reasonable to assume that people who have the amenities of life and a reasonable amount of security will strive to better themselves, then it is necessary to create an environment which will foster these vital forces that are necessary for community viability and growth. From this can develop community awareness and then the spirit of cooperativeness. Becoming aware of the needs and wants that are similar to one's own -- knowing you're not alone -- can help bring people together to work toward bettering their communities and themselves."***

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* Ibid, p. 16

** Ibid, p. 17

*** Ibid , p. 17

"This community planning and development stage may be enhanced by a telecommunications system. It can provide a means for the community to engage in collective decision-making. Information obtained in this way also can be a valuable resource for county or state, as well as the local governments to ensure that the needs of the people are being met. If it can work on a community basis, and there are examples in Canada where it has worked, (they refer to the efforts of the National Film Board of Canada -- Challenge for Change --) then there is hope, at least, that it can work on a state-wide basis. This community interaction and closer proximity to state operations could help to foster the feeling of being a part of the "action" -- being involved."*

In summary, the proposal stipulates that, "Diversifying and strengthening the rural economic, social, and cultural structure through the use of telecommunications might provide an alternative to the drastic dislocations and discontinuities of migration to urban areas. New alternatives do not always provide new benefits. But, if the trial program is even partially successful, it may provide a valuable contribution to rural development and reduction of the population flow to the urban centers." One thing is certain: migration to the city is an unhappy solution. Perhaps the most important factor would be that people would have an option."**

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* Ibid p. 18

** Ibid, p. 19

4.2 Education

Recent developments in telecommunications technology shows a growing concern on the part of educators as to the best methods of making the new technology more relevant to their needs and the needs of educational institutions in general. In fact, some demonstrations have led researchers to conclude that the technology may most effectively be used for instructional purposes outside the restricted boundaries of the classrooms rather than simply a concentration on software for in-school use. So far, however, it is apparent that educational demonstrations have not been as frequent nor as active as the potential permits. This report reviews selected representative samples of educational demonstrations by both telecommunications operators as well as educators. They range from those which are simply promotional and commercial to some experimental instructional demonstrations of innovative educational models. Most demonstrations tended toward developing methods of reaching non-traditional students (persons unable to attend classes full time).

It is obvious that as the new technology develops, educators will have to take a more committed role in implementing the promises made by the new technology. Particularly, more substantive uses will have to be made in the use of communications technology in non-institutional environments. Also, more dollars will have to be spent in order to make a real curricular impact.

Finally, more systematic evaluation and documentation will be needed to establish education's continued use of telecommunications.

The following are samples of educational telecommunications demonstrations.

4.2.1 Closed-Circuit Microwave Television - Tager:

The Association for Graduate Education and Research operated a closed-circuit microwave educational television system which interconnects

nine colleges and universities over approximately 2,000 square miles in the North Texas area. The purpose of the system is for the sharing of resources via the television facilities among nine institutions. As a result of the systems, the highest quality instruction is available to all campuses, which permits the development of joint-institutional curricula in academic disciplines where no institution singly has adequate resources. In addition, several major high-technology industrial firms in the region have joined the Tager system to enable their employees to participate in Tager course offerings at in-plant receiving classrooms.

Now in its seventh year, the operating characteristics of the system are now thoroughly time-tested and have proven successful. Tager customarily carries about 75 three-credit-hour courses each semester, involving between 1,600 and 2,000 students. Each course provides interaction between the instructor and the students enabling students at remote classrooms to ask questions of the instructor and participate directly in the class. All other students on the network also hear the questions and can respond or join in a discussion. Thus, the customary classroom environment is preserved as fully as possible.

At the present time, the staff of the Tager system are not considering using other telecommunications technology, such as cable television, because of the necessity to provide live talkback for large numbers of students scattered throughout a metropolitan region. However, another option could be to locate several cable television receiving sites in convenient locations, and equipping them with a talkback facility for live participation from some groups of students. Other students in the same class could not participate in the interaction, but could hear the discussion.

The administrative staff of the Tager system feel the demonstration has significantly improved and expanded the range and quality of the

inter-institutional course offerings, but that the system also makes readily possible extensions of academic service for new clienteles (i.e. independent study, continuing education, refresher and retraining programs, etc.) Currently, intensive study and planning is taking place in order to determine how additional opportunities can best be accomplished over the system.

4.2.2 Project REACH, Dayton-Miami Valley Consortium, Ohio:

REACH is an educational cable television project sponsored by the Office of Community Services of the Dayton-Miami Valley Consortium through a grant from the Fund for Improvement of Postsecondary Education (HEW). REACH provides cable systems with both credited and non-credit educational courses. The project stresses leisure-time learning-educational experiences incorporated in recreational activities. "REACH is identifying leisure time and developing community responsive leisure time learning opportunities for home and work-bound individuals." The project staff receives community input into the design of programs through a local Advisory Board and inter-active workshops.

The workshops (which are follow-ups for the courses) provide an opportunity for individuals to put into practice what has been presented on television, while at the same time, make educational uses of leisure time. Most of the courses currently being presented over the cable system are "how to do" programs on such topics as indoor gardening, astrology, and flower arranging. Courses in production include: "Effective Parenting"; "Your Job! How it Finds You"; "Planning Your Retirement"; and "Understanding Yourself". Some of the colleges in Ohio are creating or expanding these family psychology courses for college credit offerings. These colleges include Wright State University, University of Dayton and Antioch College.

Future production will focus on "courses which enlarge participants' potential for greater self understanding, or community service."

Among the courses under revision are "You and Your Environment"; "Selecting a College"; and "Be a Smart Consumer". Each course consists of five half-hour videotaped sessions which are augmented by two workshops or community conferences of about two hours each.

4.2.3 ATS-6 Satellite:

For one year, the National Aeronautics and Space Administration conducted demonstrations on the ATS-6 satellite. Among the experiments was the Appalachian Educational Satellite Project (AESP) which provided direct communications between teachers in 15 Regional Education Services Agencies (RESA) from Guntersville, Alabama to Fredonia, New York in courses designed to upgrade elementary teachers skills.

The project was a joint venture of the Appalachian Region Commission (ARC) under the auspices of the National Institute of Education (NIE) and NASA. Experiments covered health and educational television transmission, navigation and traffic control, intersatellite transmission, radio interference measurement and weather research. The major thrust, however, of the project was a focus on ways kindergarten through sixth grade teachers structure curricula for career education. Sixteen sites were involved in the demonstration in 13 states in the Appalachian region--including a production center at the University of Kentucky at Lexington, where the programs were prepared.

4.2.4 Cable Television in College Outreach Program:

A continuing education program used at Flathead Valley Community College, Kalispell, Montana, uses cable television to reach adults not served through traditional methods. The program is called "Total Community Education" (TCE) and is funded by a grant from the Fund for the Improvement of Post-Secondary Education (under the Department of Health Education and Welfare). Now in its third year of operation, TCE is attempting to serve a population of 5,000 people, spread over a widely diverse area. Program emphasis includes extensive activity on the Blackfeet Indian Reservation, 130 miles east of the campus. The Blackfeet extension program has included the introduction of portable video technology to the small reservation town of Heart Butte.

Presently, through various government agencies, TCE is reaching the most remote parts of the valley, using rural grange halls and schools as viewing centers for specific programs presented via closed-circuit playback. In the future the program hopes to move from total government funding to independent operation. The project enjoys a close working relationship with the management of Kalispell Cable TV, a TelePrompTer outlet, including providing studio space and equipment for TCE.

TCE envisions itself as a supplement to traditional methods of delivering educational, cultural and social services to a rural community through the use of educational/instructional television. The project will continue to use both cable and closed-circuit television to expand post-secondary level course work, continuing education programs and specially developed supplemental programming for adult learners.

4.2.5 Computer Used to Follow Progress of Migrant School Children:

In an effort to maintain school records of migrant children, Public Law (93-380) was passed in 1974 which authorizes the use of Migrant Student Record Transfer System (MSRTS) -- a central computer data bank, located in Little Rock, Arkansas. It can trace the whereabouts of each child as he/she migrates from one harvest to another. When the Title I migrant education program was authorized by the Congress, no one really knew how many migrant children there were or even where they were. However, through the MSRTS, it is now possible to produce an official count of migrant children.

It took 30 months for all the states to agree on what information should be included in the records of these children. There was the matter of privacy to be considered and the extent of the information needed. In the end, it was agreed that each record should contain the child's name, sex, birthday, and birthplace; his math and reading scores from the last four schools attended; and coded information on health examinations and a variety of childhood diseases. A child's record can be supplied to school officials and health authorities within four to 24 hours after the request is made. Thus, the MSRTS system makes it easier to place migrant children in their proper grade, while at the same time eliminates multiple testing and physical examinations.

4.3 Health

Looking at the latter 70's and into the 1980's, changes can be seen in the delivery of health and related social services, especially for rural areas. The potential use of not only cable, but other communications technologies such as satellites, laser systems, micro-wave, multi-point distribution systems and fibre optic networks, are promising to radically alter the quality of life, especially for the poor and disadvantaged in small underdeveloped areas. Demonstrations so far are uncovering the kind of technology which will begin to furnish substantially new services that will provide vitally needed links between the patient, medical center, outreach programs, service agencies, and the upgrading of medical personnel. This technology is of particular concern for the educational upgrading and information exchange among health care professionals in disadvantaged, remote and rural areas of the south.

From the demonstrations reviewed for this report, a basic need to determine how best telecommunications might be utilized to meet rural health needs was a common concern. A sampling of those demonstrations follows:

4.3.1. Two-Way Audio-Video-Data In Jonathan, Minnesota

This experiment was designed to evaluate a two-way audio-video cable link between two rural group practice clinics and a hospital in Minnesota. The link covers about 13 miles, joining Jonathan Lakeview Clinic, Waconia Lakeview Clinic, and Waconia Ridgeview Hospital. Nearly 12 of the 13 miles of cable was mounted aerially on utility poles. From about 200 transmissions

which took place in the period January 1973 - January 1974, a third involved teleconsultations, telediagnosis and followup exams, another third involved data transmission (EKG, X-ray, Chart), and the remaining third involved patient monitoring and conversations. The project was terminated in 1974.

4.3.2 Microwave System on Reservation

Two-way audio-video-data, slow-scan video is being used on the Papago Reservation (STARPAHC) in limited combinations. Began in 1973 through funding from HEW, the STARPAHC acronym stands for Space Technology Applied to Rural Papago Advanced Health Care. The program is an assembly of a ground-based remote area health care delivery system for two years. Its major objectives are to provide data for developing health care for future manned spacecraft and to improve the delivery of health care to remote areas on earth. STARPAHC will provide improved communication methods, a mobile health unit, advanced health care equipment, computer aids, and assistance to allied health professionals and paramedical personnel.

4.3.3. ATS-6 PEACESAT, Telecommunication, Tele-Education (Satellite)

A two-way audio and facsimile (no video) has operated since 1971 in Hawaii and Pacific, Honolulu. The PEACESAT (Pacific Education and Communication Experiment by Satellite) project includes health and medical consultations and a variety of educational formats. As of October 1974, there were 11 nations or jurisdictions in the Pacific Area served by the interactive audio system. These locations stretch from the National Library of Medicine in Maryland to Hawaiian sites, to Fuji, New Zealand, Tonga, New Guinea, American Samoa and the Trust Territory of the Pacific Islands. Average use is three hours per week. The interactions have included

teleconsultations between physicians, teacher education, student classes, and sharing of library resources.

4.3.4. Hospital Radio Network

The Hospital Council of Southern California operates a radio network for emergency communications between 118 hospitals in the Los Angeles area. Included in the network are certain hospitals designated as regional hospitals, and are supplied with the most powerful transmitters and receivers. Two frequencies are employed -- one for intra-regional and one for inter-regional communications. The Hospital Council serves as the central headquarters for the network and is the official point of contact with police, fire station, public health, and Red Cross facilities during emergencies.

Among the functions of the network is to serve during disasters in the transfer of information on patients, inform medical personnel on the location of specific blood types, drugs, supplies and equipment, coordinate triage teams, and locate and direct physicians to appropriate sites and hospitals.

During the Los Angeles earthquake in 1971, the value of the radio network was conclusively demonstrated. Two large hospitals were totally destroyed and two were seriously damaged and had to be evacuated. In addition, there were 3,000 persons injured in the earthquake who needed treatment. Later a task force from the White House Office of Emergency Preparedness reported that to their knowledge this "was the first major or civil disaster...in which a separate, self-sufficient medical hospital radio communications network played a major role. This system worked

effectively and undoubtedly made the difference between utter chaos and an orderly response to the affected area's medical and hospital needs."

4.3.5. Medical Interactive Television Network

An interstate television network has been established between Vermont and New Hampshire for the exchange of medical information. The locations are Dartmouth Medical School and University Hospital in Hanover, and the University of Vermont College of Medicine in Burlington, Vermont. Eventually the network will expand to connect 20 hospitals and medical institutions in four states. The system uses switched closed-circuit television with microwave linkage.

Initially, Dartmouth and a small community hospital, Claremont General, were connected by microwave over the 30-mile distance between them. Later Central Vermont Hospital in Berlin, Vermont joined the system in order to provide services such as the transmitting of information (i.e. EKGs, computer data, heart sound and breath sounds, as well as audio-visual information). Distant coronary care units, radiology departments, psychiatry and medical offices, and medical education classrooms are connected within the network.

Medical personnel involved in the network have continuous involvement with each other. This has brought about an emphasis on interactive, live seminars, conferences, and consultations. In other words, the goal has been to develop the personal interactive functions of the system. Programming time usually averages 40 hours per week, with 140 hours per week projected by 1977.

Medical conferences between the hospitals and medical schools are assisting in the examining of problems in a variety of fields such as speech therapy and psychiatry. In addition, physicians and students can observe patient-doctor interaction over a monitor. The observations are then discussed with the attending physician.

Consultations are being scheduled on a regular basis. The problem in implementing a consultation program is that the doctor in the community hospital must be willing to ask for help, a situation which is probably not as common as it should be in the medical profession. Thus, the project administrators view the building of this mutual assistance relationship between doctors as the most important issue in the success of the project. This is an example of a service which would not exist or would exist only on a minor scale without the telecommunications network.

The existing system is only the first phase of an ambitious plan. Other projected functions are classroom-to-classroom interactive medical education, consultation and sharing of staff experiences, telediagnosis and patient record-keeping, continuing medical education, allied health personnel training, and administrative communications and data exchange.

Also, in the future plans of the network is the building of a control for all 20 institutions at Dartmouth. The control system will allow coordination of user schedules and switching and routing. Each institution will also have extensive in-house cable wiring to distribute the signals received by microwave. The already existing Vermont ETV microwave system will be shared by the medical project, as well as the ETV's equipment space, waveguide, towers, and antennas.

4.3.6. ATS-1 Satellite in Alaska

Towns throughout Alaska are connected through the NASA ATS-1

satellite via a voice link. The project, which began in 1971 through a program sponsored by the Lister Hill National Center for Biomedical Communications, transmits medical information two hours a day, seven days a week, between villages, field service unit hospitals, and medical centers. The purpose of the project is to provide a number of services, including patient education, community education for health aides, doctors and nurses, and the facsimile transmission of graphic and computer data. In addition, voice consultation is conducted between community health aides and physicians at hospitals. Hospitalized patient may also visit with their families in remote villages. As a result of the project, a determination can be made of the scope of services which may be provided in an audio medical network.

4.3.7. Patient Information Via CCTV

A system for providing medical education and information to hospital patients is successfully being used by Baroness Erlanger Hospital in Chattanooga, Tennessee. The hospital has 652 adult beds and a 110-bed pediatric ward.

The system dubed the "video juke box," consists of two automatic video cassette changer/programmers that can play up to 12 one-hour cassettes without repetition. One of the "video juke boxes" is used to provide the pediatrics wing with educational and entertainment programming, while the other is used for adult patient education. Among the programs are health care education, such as breast feeding, weight reduction and control, care of new-born babies, glaucoma, post-coronary care, high blood pressure, and diabetes. The other half of the programming is entertainment. Patients

view the programs over their CCTV receiver, which the hospital provides at no extra charge, plus a schedule is supplied each week of the programs planned.

In addition to the programs targeted for patients, a switcher in the main studio allows distribution of certain programs to specific areas of the hospital for use by the hospital staff. At present, all of the programs are purchased from Viacom Southeastern Corporation in Atlanta, but the hospital anticipated beginning production of programming this year that will be aimed at its own specific needs.

It is too early to determine what effects the patient education project has had in cutting down on patient release time and the number of return patients, but it seems the patients are very pleased. Administration and staff are also enthusiastic about the time they save because the televised programs can take over some of the educational chores that used to be so time consuming.

According to an article in the July, 1975 issue of Educational and Industrial Television, "The machines have easily replaced what would normally be another person in our office alone, and the hospital has been busy working on new applications. It really gives us more time to do other things and provide better services in other areas as well."

4.3.8. Rural Health Associates-Group Practice with Microwave

Rural Health Associates is a medical group practice in Farmington, Maine with a two-way link to two ambulatory care satellite clinics located in Rangeley (40 miles northwest) and Kingfield (20 miles north) separated by mountainous terrain. Since 1971, the purpose of the project has been to

provide comprehensive health care for patients in rural isolated areas, to provide support for health care professionals so that they may live and function in rural areas at distances from major medical centers, and to provide enough coverage so that these professionals can afford the time for continuing education and preventive care. While no carefully evaluated results are available, the general objectives of this rural group practice are reportedly being achieved.

4.3.9 An Experiment to Study the Communications Technology Required to Support Health Personnel in Isolated Areas

HEW Public Health Resource Administration project is currently being planned by the Mitre Corporation. The experiment is to both design and implement health care projects utilizing non-physicians such as Medexes, nurse practitioners, and physician extenders to increase the level and the quality of health care in rural areas. The basic model is one of employing telecommunications to increase contact between centralized medical professionals and outlying satellite clinic-personnel.

4.4 Information Dissemination

Demonstration projects solely concerned with the economic feasibility and social cost considerations of information retrieval and dissemination in rural areas are few indeed. Most projects with an information dissemination component usually have a more concrete area of concern to address (e.g. Health, Educational Services; Entertainment). The few projects which do focus on the information aspects of technology and rural development have come from the library and information sciences field. These professional bodies seek constantly to extend their traditional services of book lending and information advice giving to those clients in isolated areas and to patrons confined by reasons of advance age, ill health, or criminal offense. CATV, Satellite Technology, Mobile Units, etc. have been used in various attempts to cut the rising costs of most library operations, by reaching a wider variety of people with more specifically defined services. The reader is advised to consult the other demonstration projects listed in this report for more specific examples of information dissemination and technology interface.

4.4.1 North Dakota Agribusiness Marketing Information:

North Dakota State University Department of Agricultureal Economics Fargo, North Dakota. 1972 - 1974. Principal investigator D. W. Cobia. Purpose of the project was to ascertain information required of the agribusiness sector; recommend ways of closing the information dessemination gaps and of providing needed information not currently being generated. It was funded by the State of North Dakota.

4.4.2 Mediamobile Service to Community Centers and Rural Communities:

Vigo County Public Library, Terre Haute, Indiana. Principal investigators were Harmond Boyd; Betty Dodson; Jean Conyers and Max Miller. Funded by U.S. Office of Education, Library Services and Construction Act, the project began in 1972 and is still in progress. Mediamobile is used as the means of getting materials and staff to community centers and outlying areas of the county, serving both as a transport vehicle and a mobile display and lending unit.

4.4.3 A Library and Learning Services:

East Central State College, Ada, Oklahoma, experimented with a delivery system for library services. Principal investigators are Robert Garner; Bill Darnell, and Henry Hicks. Funded by the U.S. National Institutes of Health, it ran from 1972-1974. The purpose of the project was "to determine steps necessary for the planning and establishment of an area library learning center to provide integrated services to meet identified needs through multiple funding sources." The project demonstrated that agencies concerned with similar education and library services can work together.

4.4.4 National Science Foundation Awards Grant For Continuation of Census Use Activities

The Clearinghouse and Laboratory for Census Data was developed jointly by the Center for Research Libraries in Chicago and National Data Use and Access Laboratories (DUALabs) in Washington, D.C. in January 1972 to insure the maximum application of census data to research applied to national needs. CLCD's major activities have been in training of users of the census, providing orientation and guidance on the use of census data for particular problems, developing a broad range of publications, catalogs, and reference guides, and assisting users in finding the census data they need for their research. Anyone with a problem to which census data might be applied can go to the User Contact Sites located in 19 states for free orientation and guidance. Economists, administrators, educators, planners, demographers, and all others whose work may benefit from the application of census data are encouraged to write to the CLCD for detailed information about the publications, seminars ,free guidance and data reference services available to them.

4.4.5 National Storage and Retrieval System,and Research on Implications of Cable TV

A report by the Committee on Public Engineering Policy (COPEP) of the National Academy of Engineering has been submitted to the National Science Foundation for its program of Research Applied to National Needs (RANN). Designed to contribute to further planning of the RANN program, the report entitled "Priorities for Research Applicable to National Needs,"

urges an adventurous and innovative approach to fundamental and long-term problems, going beyond the research programs of other federal agencies.

The report highlights a series of themes related to problems in turning science and engineering to social purpose, and includes thirty-one detailed research recommendations. The RANN program has placed significantly increased emphasis on applied social science research and research into national problems of effective delivery of governmental and human services (e.g., health, education, urban transportation, fire and police protection, waste disposal). "Conservation and patterns of consumption" stresses research into the "demand side" of the supply and demand equation in respect to several problem areas, emphasizing concern for the scarcity of energy, environmental, and material resources.

4.4.6 The Center for Policy Research Launched--MINERVA:

A participatory technology system or Multiple Input Network for Evaluating Reactions, Votes, and Attitudes, was initiated in 1971. Technological features essential to MINERVA include a device for recognizing and limiting speakers, feedback reporting for groups to permit consensus evolution, and visual two-way communications. A public building prototype, a county government system, an inter-community network, and intra-inter community TV demonstrations, the projects utilize MINERVA applications including experiments in the concept of "electronic town meetings", in which cable is used to increase citizen participation in decision-making.

4.4.7 The Department of Defense, The Wired Garrison:

This is a continuing project which started in October 1972 and is operated by the Department of the Army, with contractual assistance from the Mitre Corporation of Bedford, Mass. The Wired Garrison concentrated its first two years on a feasibility and technical viability study to determine how it should approach the transfer of the wired city concept to a military base using two-way cable applications. Presently, the Department of the Army is doing an engineering design study. The design of a testbed to determine the cost of building and operating an interactive cable system is being determined, using Fort Bliss (El Paso, Texas) as the site.

4.4.8 Major NSF Projects: The following demonstrations represent Phase II of the National Science Foundation's "Cable Experiment Competition:"

Test and Evaluation of Public Service Uses of Cable Television: Rockford, Illinois:

East Lansing, Michigan, Michigan State University, Dept. of TV and Radio is conducting a project with Thomas F. Baldwin as Principal Investigator. It is funded through NSF for $430,200 and scheduled to run from May 1, 1975 to April, 1978. The objective of this project is to test the relative cost and effectiveness of using two-way cable television to deliver training to firefighters in Rockford, Illinois. The experiment will test the relative costs and effectiveness of delivering training material using two-way cable television compared to more conventional means. The existing cable system in Rockford which will be used, is capable of two-way communications including video, audio and data signals in the upstream direction. A mini-computer will be added for system control purposes, with digital response terminals in the firehouses.

Test and Evaluation of Public Service Uses of Cable Television: Spartanburg, S.C:

NSF has funded ($1,106,566) to the Rand Corporation to conduct a project from June 30, 1975 to December 1977. The objective of this research project is to test the relative cost and

effectiveness of three public service applications of cable television in Spartansburg, South Carolina. The three applications are: (1) adult education; (2) the training of day care workers; and (3) coordination of input procedures for welfare programs. For each application, a controlled experiment is planned to test the relative cost and effectiveness of delivering the service using two-way cable television compared to more conventional means.

Test and Evaluation of Public Service Uses of Cable Television: Reading, Pennsylvania:

The Alternate Media Center, New York University, has been funded by NSF ($398,700) to conduct a project between May 1, 1975 and August 31, 1976. The objective of this research is to test the costs and effectiveness of using two-way cable television to deliver selected services to the elderly in Reading, Penn. The services to be provided are: (1) information and referral -- intended to ask clients about their needs, to provide information on available social services, and to provide referral to appropriate social service agencies; (2) education and training -- a range of topics of interest to the elderly will be covered including such things as budgeting skills, topics concerned with the emotional and physical aspects of aging, training and vocational and helping skills, and first aid and self care; and (3) citizen-government interaction -- the intent is to involve elderly citizens more directly in local decision making processes through meetings and teleconferences with each other and public officials. The project has received funding for one year for the start-up phase, and it is expected that additional funds will be awarded for completion of the project within a three year period.

4.5. Entertainment/Recreation/Cultural

For most rural areas and small towns in this country, the home television set reigns supreme as the chief recreational and entertainment diversion. Any discussion of cable demonstration projects in the vein of entertainment/recreation/cultural programming must point out the obvious fact that the great majority of program transmission via cable or broadcast television falls in the entertainment category. However, certain programming that is being produced by local cable systems specifically addresses the recreational and entertainment needs of their local community. Additionally, there are limited demonstrations and research projects focused on the quality and content of entertainment programs produced for cable systems and television in general that either directly or indirectly apply to those needs in all rural areas.

This section of the report describes a representative sample. Most cable systems that are involved in local origination programming focus their activities on shows which are designed as a source of revenue through advertising, sponsorship, or increased subscriber levels. There is a preponderance of local sports programming which may range from high school football and basketball games to the county horseshoe throwing championship.

This investigation has shown that there is very little innovative program demonstration work now going on directed toward specialized entertainment via cable television for either rural or urban areas. Most research and demonstration in this field is conducted privately for commercial, network television and is primarily in the area of market studies and analyses.

Some cable system operators, recognizing opportunities to respond to

real community needs have initiated programs spotlighting local entertainment, recreation and culture. Representative programs of this type are discussed in the following list which also speaks to the small number of federally funded projects focusing on the entertainment and cultural role of television.

4.5.1. Videomaker, Cokeville, Illinois

Videomaker is an attempt to stimulate the development of human resources in the Tennessee/Virginia Appalachian area. The project has been funded by the Appalachian Regional Commission and serves as a local origination agency for eight cable television systems and one educational television station in the area. Videomaker is also a producer of film and broadcast materials for distribution to various sources both in and out of the Tennessee/Virginia boundaries.

The primary purpose of Videomaker is to meet the great need for rural mountain people to communicate with one another, and to share experience for education and diversion. Another purpose is to help universities, schools, cable systems and others to achieve better insight and increased sensitivity into the Appalachian region, the rich cultural heritage of its people, and the persistent problems of the area.

Tapes that have been produced include topics such as strip mining, the Hyden mine disaster, the high rate of military desertion among Appalachian soldiers, the mine workers union struggles, folk songs, and visual/oral histories and recollections of "old timers." Tapes are available for nation-wide distribution.

Southern Outlook

G.E. Cablevision in Biloxi, Mississippi produces a locally originated television series designed to demonstrate the richness and variety of the life

and history of that area of the South. The program utilizes a video van which logs over one thousand miles per series taping local events, personalities, programs and disseminating the shows via the cable television system. Programs are taped each week and include areas such as culture, education, entertainment, cooking, politics, religion, history, the arts, etc. Over 100 regional locations have been highlighted in this program series.

4.5.3 The Gaslight Show

This program, cablecast by Fayetteville Cablevision, Inc. in Fayetteville, North Carolina, is a weekly, thirty-minute musical variety show, produced through the cooperative efforts of the cable system and a local night club cabaret. The show simulates a night club atmosphere, and highlights musical entertainment. Through arrangements with the local club, the talent is furnished free of charge in return for the production work, airing, and promotional announcements. Performers change weekly and are semi-professionals who work the southeast night club circuit. The wide appeal of this series has attracted other talented people in the area and has generated additional original programming activities.

5.4.4. Encore

Another local production of G.E. Cablevision in Biloxi, Mississippi, is a program aimed at gaining wider audiences for and broadening the appeal of local professional performances. Encore is a repeat, a replay of productions by groups such as the local theater. Encore will, when permitted, cover any professional performance. Little theater productions are taped, edited to 40-50 minutes and aired often with behind-the-scenes interviews of key cast and production figures. Encore's purpose is to bring performing entertainment to the viewers, to generate interest in local cultural activities,

to bring local art programs to those unable to leave their places of residence or without traditional means of access to live performances and to show a wider audience the range of talent in South Mississippi.

4.5.5. Bi-Cities Cable TV

Serving the Petersburg, Virginia area, the Bi-Cities TV produces a series of weekly remotes that are video-taped at local night clubs in the region. The advantage of this telecast include economic and social benefits. The viewers enjoy the change from traditional television fare, the night club owners pay for program sponsorship, and the night club owners draw future business from people viewing the show and from those who want to be in the live audience during the taping.

4.5.6. Breakfast at Korvettes

A shopping center near Reading, Pennsylvania, which was experiencing difficulty in the community for a variety of reasons, has improved its business and community relations due to the production of a weekly show telecast by Berks Cable Company. A game show is produced every week at the center, providing advertising and promotion for the center which pays the costs of the production.

4.5.7. Preliminary Investigation of the Special Impact of Television on Blacks

Funded by the National Science Foundation, Booker T. Washington Foundation/Cablecommunications Resource Center is about to begin Phase II of a major research project to determine the psychological effects of television (primarily commercial broadcast television) on blacks. Phase I has included an analysis of current research methods and other methods; a reappraisal of existing data in an attempt to develop and/or refine these research methods to make them appropriate for use in studies of blacks; and

preparation of a detailed research plan and appropriate research tools to be used in Phase II which will undertake an extensive investigation of specific aspects of the effects of television on blacks. Phase II is essentially a field research effort leading to Phase III, the program production and broadcast application of research findings that provide information and motivation to blacks in several specific areas of programming.

4.5.8. National Endowment for the Arts

The Expansion Arts Program of the National Endowment for the Arts has provided a grant to Booker T. Washington Foundation/Cablecommunications Resource Center for the purpose of disseminating information to community art groups throughout the country on cable programming opportunities and the potential utilization of those opportunities for the expansion and enrichment of community-based arts programs. A handbook is being prepared which will be sent to community arts groups through rural and urban America providing concise, usable information regarding access, cable technology, and production resources. As this project enters its second year of development, a model demonstration for the optimal use of cable technology as a resource for community arts programs will be designed.

The Public Media Program of the National Endowment for the Arts has funded several cable television projects including a program at the Alternate Media Center in New York which involves the placement of filmmakers in residence at cable television stations around the country. Public Media has also provided grants to Open Channel in New York City, an organization devoted to uses of public access channels on cable, and to the Planning

Corporation for the Arts/Cable Arts Foundation also in New York. This group is involved in the dissemination of programs on the fine arts via cable television.

4.5.9."Main Street "

Produced by Telerama, a cable system in Portage, Ohio, "Main Street" is a sixty-minute entertainment/variety program which highlights activities and people within Portage County. This program is divided into distinct segments: a) an interview with a typical resident who has interesting vocations, hobbies, and special talents; b) Cable Comments, a slide/voice-over-segment, which involves man-on-the-street interviews on local topics or issues; c) Local Sports, commentary on the week's sports activities by a local high school student; d) Job Opening, a listing of jobs available through the Bureau of Employment Services; e) musical segment and interview with a guest artist; and f) Local Movie/Theater Reviews spotlighting productions in the area. The overall theme of Main Street is to provide residents with entertainment focused on Portage County. Guests represent a wide spectrum--a championship equestrian rider, artists, an archaeologist, musical instrument inventor, a bank president who is spearheading a redevelopment project in the county seat, etc.

5.0 POLICY ANALYSIS

5.1 Legislation and Federal Involvement

5.1.1 Congressional Deliberations: The challenge of bringing cable to sparsely populated rural areas has not escaped Congressional notice. A number of Congressional hearings, reports and proposed bills have treated various aspects of the rural cable question, but this review will site only major sources of such materials. As early as 1958, the U. S. Senate Committee on Commerce produced two reports dealing with the issue of rural cable. (Documents are cited by the numbers and sessions of the Congress producing them -- e.g. 85.2 indicates 85th Congress, second session). The first was (85.2) A Review of Allocation Problems of Television Service to Smaller Communities and the second (85.2) The Problems of Television Service for Smaller Communities: FCC Staff Report (Cox) December 1958. The U. S. Senate Committee on Commerce also produced a report (92.1) on Community Antenna Television Problems in 1971.

More recently proposed legislation has appeared in the Senate and the House which hopes to create special REA type low interest loans for the development of rural cable systems. On the Senate side, Alaska's Senators Mike Gravel and Ted Stevens sponsored a 1972 bill (S.1219), which would make federal, low-cost long-term loans available to qualified groups, including co-ops, in areas of low population density. In 1973, Representative Robert Tiernan introduced a bill (H.R.5319) which would make available 35-year, 4 percent loans to cable systems that "can reasonable expect to pass less than a system average of 60 potential customers per linear mile during the first five years of operation." On January 14, 1975, Rep. Thomas Downing introduced a similar bill, (H.R.244). This bill was referred to the sub-committee on communications on February 11, 1975 and as yet no hearings have been set and no action taken.

Another bill which can have significant implications for rural areas is a bill introduced to provide grant assistance for telecommunications facilities and demonstrations. Senator Warren G. Magunson submitted this bill on March 20, 1975 known as the "Telecommunications Facilities and Demonstration Act of 1975." The purpose of this piece of legislation is to assist (through matching grants) in the construction of non-commercial educational television or radio broadcasting facilities and to demonstrate (through grants or contracts) the use of telecommunications technologies for the distribution and dissemination of health, education and other social service information. The appropriations for this act are set at $7 million for the fiscal year ending June 30, 1976. Under this bill, grants can be made to or contract entered into with public and private, non-profit agencies, organizations and institutions for the purpose of carrying out telecommunications demonstrations. An important point to note under this bill is the stipulation that the facilities and equipment acquired or developed with the aid of such grant funds can only be used for the transmission, distribution and delivery of health, education, or social service information.

The funding of any one demonstration project is limited to three years. At present, the bill is before the Commerce Committee but no hearings have been scheduled. The passage of this bill could have significant impact in aiding or supporting the development of a rural telecommunications demonstration project.

In addition to these legislative initiatives, the Office of Technology Assessment, at the behest of Senator Herman Talmadge, has initiated an

evaluation of the need for an impact study of telecommunications technology on rural development. (The Office of Technology Assessment is an advisory arm of the United States Congress. Its basic function is to help legislative policy-makers anticipate and plan for the consequences of technological changes and to examine the many ways, expected and unexpected, in which technology affects people's lives. The assessment of technology calls for exploration of the physical, biological, economic, social and political impacts which can result from applications of scientific knowledge.) Specifically, the study according to Robert Anthony, its chief investigator, is attempting to examine the contrasts between rural and urban areas with regard to the functional categories of social service, economics, decision-making as well as the impact of telecommunications on migratory flows. At present, the current evaluation is going through its second review and revision process. A final report is not anticipated to be made public until the end of September 1975.

Most recently, legislation to strengthen the Commerce Department's Office of Telecommunications as "an entity whose mission will be the promotion of telecommunications technology, so that it can contribute to our national economy and the improvement of the lives of our citizens," was introduced by Chairman Harley O. Staggers (D. W. Va.) of the House Interstate and Foreign Commerce Committee on August 1, 1975.

In announcing the introduction of the bill, Chairman Staggers declared that "that broadband telecommunications technology, if it is allowed to make its full contribution, can transform our society. It can reduce to manageable levels some of our most threatening national problems, including the

energy crisis, threats to our environment, and our need for new industries, new jobs, and expanded overseas commerce. This industry, according to estimates, would contribute $20 billion to our gross national product."

He put into the Congressional Record a letter from him to President Ford in which he noted that "The country runs on the fast transfer of information. Today, it is already essential to passenger and freight transportation, to bank clearings, to buying and selling, and to entertainment and news. Tomorrow, it will become equally essential in teaching our children, to healing our sick, and to governing our cities and towns...."

Finally, he stated, "I understand that most of the technology required for a high capacity interactive broadband communications system that is capable of carrying television signals in both directions has been available for some time, but that recent developments in circuit techniques have reduced the costs for such complex systems to a point where implementation has become practical."

This bill (H.R.9289) cited as the Telecommunications Technology Act of 1975, sets forth a number of important provisions and premises that directly support not only the rationale for this study, but the further implementation of a rural telecommunications demonstrations project. First of all, the bill states, while telecommunications technologies have contributed significantly to improving the quality of life in the United States and the rest of the world, it still has certain as yet unrealized potential that needs to be tapped. The bill lists 11 such unrealized potential areas. Among the most significant areas are: (1) the need to increase the availability of information on diverse cultural amenities and federal, state and

local governmental services to our Nation's urban, suburban and rural citizens; (2) the need to enhance productivity in all sectors of our economy; (3) the need to facilitate the exchange of information and views among our citizens, and improve their ability to participate in their government at the federal, state and local levels; (4) the need to contribute to the conduct of domestic and international commerce and trade, improve our domestic posture and balance of trade in telecommunications goods and services, and provide new jobs and economic opportunities for our citizens; (5) the need to improve the quality and increase the variety of available health services and care; and (6) the need to increase the quality of life for all our citizens.

The bill then lists a variety of impediments that stand in the way of the full implementation of telecommunications technology to the national benefit. An abbreviated list of these impediments follows: (1) lack of adequate information about or understanding of telecommunications technology among a significant number of those in a position to hasten, deter, or regulate its progress; (2) lack of sufficiently detailed social, economic, and technical information to enable sound selection from among the many choices and options offered by telecommunications technology; (3) lack of national goals, priorities, policies, and plans specific to telecommunications; (4) lack of sufficient engineering and commercial standardization for telecommunications; and (5) lack of sufficient capital to finance production of telecommunications technology products and services which have not yet been demonstrated to be marketable. Most significantly, the bill concludes that based on some obvious review of contemporary telecommunications projects, "Present Federal activities in support of telecommunications technology, and utilization, have been fragmentary and inefficient,

thus preventing telecommunications from making its rightful contribution to our Nation's economy and well-being."

The bill overall suggests that in order to: (1) realize the potentials of telecommunications technology, to further improve the strength of our Nation's economy and quality of life and (2) reduce impediments to effective development and utilization of domestic and international commerce in telecommunications technology, that there must be the establishment within the Department of Commerce of a Bureau of Telecommunications.

The bill also authorizes the Secretary of Commerce to conduct, support, or participate with other Federal departments or agencies as appropriate in the conduct or support of projects demonstrating the feasibility and utility of new telecommunications technology, or new use of telecommunications technology in accomplishing one or more of the purposes of this act.

5.1.2 Research and Development Efforts: In addition to past reports turned out by Senate subcommittees, the current investigations by the Office of Technology Assessment and pending telecommunications bills of major consequences to rural areas, there is an ever-growing cadre of federal bodies that have demonstrated their interest in telecommunications through their research and development efforts. A case in point is the Department of Defense, which is spending several million dollars in a multi-year examination of the use of cable for social service delivery and entertainment to their military bases throughout the world. This research, popularly known as "The Wired Garrison," is being conducted by the Mitre Corporation, and is aimed at providing more amenable environments for the families of the men

and women who comprise the new "volunteer army." (See Section 4.4.7) In fact, the Department of Defense is rapidly becoming one of the major supporters of contracted research in the telecommunications field and "The Wired Garrison" may very well provide some indication of the impact and cost-effectiveness of many of the telecommunications/service delivery concepts in civilian communities.

Table 1 shows the approximately yearly spending (for contracted research over a three-year period) of the major agencies supporting telecommunications. The Department of Defense has been omitted because no exact figure on its expenditures could be obtained. Likewise, the Department of Health, Education and Welfare's Office of Education (HEW/OE), while supporting some research, had no major project activities in terms of dollars for that period.

A closer look at the figures in Table 1 gives some insight into the current trends of government support. The principal areas of research appear to be education, telemedicine and public service delivery. The $5 million allocated by the National Institute of Education (NIE) was primarily to support the ATS-6 (Applications Technology Satellite-6) satellite education program, which examined the educational uses of satellite communications in the remote areas of Appalachia, the Rocky Mountains and Alaska. The Health Resources Administration (HRA) has spent more than half of its $500,000 on a project to develop a demonstration of the use of telecommunications by medical paraprofessionals in rural health care. The National Library of Medicine's Lister Hill Center has an on-going program of research in telecommunications applications for medical information. In the area of public service delivery, the National Science Foundation (NSF) funded seven studies

TABLE 1

TRENDS IN FEDERALLY CONTRACTED TELECOMMUNICATIONS RESEARCH *

National Institute of Education	$5,000,000
Health Resources Administration	500,000
National Library of Medicine/Lister Hill	2,000,000
Department of Commerce/Office of Telecommunications	1,700,000
Housing and Urban Development	400,000
Federal Communications Commission	1,000,000
Office of Telecommunications Policy	1,000,000
National Science Foundation	1,000,000
Department of Defense	(not available)
Total	$12,600,000

*These figures reflect approximate funding trends for yearly expenditures by these agencies over the past three years.

in the uses of two-way cable technology for public service delivery. Of the approximately $1 million spent by NSF, $700,000 went to these studies. NSF has just awarded a series of contracts totalling $1,935,466 to test and evaluate the public service uses of cable television, as Phase II of its Cable Experiment Competition. (See Information Demonstration Projects, Section 4.5 of this report for project descriptions of the 1976 NSF awards.) The Office of Telecommunications of the Department of Commerce and the Federal Communications Commission funded a variety of studies ranging from spectrum allocation to economies of scale.

The $12 million total expenditures for this period will almost certainly increase for FY 1976, primarily because several of the major research projects were demonstration designs and will require significant increases in funding to successfully begin the implementation stage. This is true of both the NSF studies and the HRA rural telemedicine project. On the other hand, the ATS-6 project launched in May of 1974, has shifted to an orbit above India, and its uses for the present for literacy and other educational application will be drastically curtailed. NASA has announced plans to replace the satellite so that the educational services provided to the remote areas here in the United States can be maintained.

HUD has no immediate plans to fund further telecommunications research and the direction of the White House Office of Telecommunications towards an advisory posture will, from all indications, continue. The FCC does anticipate that its research funds will increase from $1 million to approximately $1.5 million.

All this taken into account should show a net increase in monies available for non-defense telecommunications research and development from

more than $12 million to as much as $18 million. However, a good portion of this money is already allocated to existing projects and should not necessarily be construed as an expansion of federal involvement in telecommunications research. On the contrary, what the trends clearly indicate is that both the agencies supporting such research and the areas of investigation are being narrowed. NSF is emerging as the principal supporter of communications research generally and the only major agency with research activities related to cable applications (excluding the DOD).

5.1.3 Federal Mandates: Besides these federal research and development activities, there is also a wide array of other federal agencies that have legislative mandates that lend themselves to supporting the development of cable television enterprises.

For example, only a cursory examination of the major enabling legislation of FHA (The Rural Development Act of 1972) and some of FHA's basic program literature is needed to substantiate this fact. First of all, the Rural Development Act of 1972 itself is essentially an act created to provide for improving the economy and living conditions in rural America. Thus, FHA through its special program, is mandated to provide new employment and business opportunities and up-grade the standard of living for all who wish to live in small towns or open country. Within the Guide to the Rural Development Act of 1972, the Honorable Earl L. Butz specifically lists cable television as a fundable enterprise under FHA loan and grant programs.

In fact, cable television is categorized in the Rural Development Act as a community facility which provides essential service to rural residents. Specifically, the Rural Cable Development Program (RCDP) falls in

line directly with three basic areas of service of the FHA: (1) to help build the economic and social base of many rural communities; (2) to expand businesses and industry, increase income and employment, and (3) to install community facilities that will help rural areas upgrade the quality of living and promote economic development and growth.

Quite obviously, OMBE and SBA, by virtue of their executive order and official mandates respectively, are also supportive of cable business development. Similarly one of the provisions of the Rural Electrification Act of the National Rural Electric Cooperative Association (NRECA) offers the possibility of funding cooperatives organized to provide cable service.

Under REA's two tier program (loans are only made to provide electric or telephone service) structure the telephone program looks most promising for financing cable ventures. On page 9, Section 203 (a) of the REA Act of 1936 defines "telephone service" as meaning "any communication service for the transmission of voice, sounds, signals, pictures, writing, or signs of all kinds through the use of electricity.....," and as including all telephone lines, facilities, or systems" and excluding "community antenna television system services or facilities other than those intended exclusively for education purposes....."

The last part of this definition seems to imply that if a cable system can be designed "exclusively for educational purposes" it could perhaps qualify for REA loans.

Here are three possible approaches toward eligibility that have been outlined in a publication by National Rural Electric Cooperative Association:

1. As a carrier, a cable co-op would rent all its channels to programmers, including a "community antenna company" in the business of acquiring television programs which it pipes to subscribers over channels leased from the carrier. Wouldn't this be "telephone service" of the sort provided by many commercial telephone companies?

2. Instead of erecting an antenna to acquire broadcast television signals, a cable system could acquire broadcast signals by "direct feed" from television stations for transmittal to subscribers (who otherwise could not receive signals). Thus, the cable system would not be providing community antenna services, since the signals carried would never have been broadcast.

3. If a cable carrier were to string dual cable, one cable carrying educational and public service programs and the second carrying over-the-air television, the first cable would clearly be eligible for REA funds. Because of identifiable economics of construction, the incremental cost of stringing the second cable in tandem would be far less, and the main portion of wiring costs could be eligible for REA funds.

Another potential funding source is the Opportunity Funding Corporation, a private, non-profit corporation chartered in 1970 and funded through OEO which attempts to show how indirect financing techniques can stimulate private investment to quicken the economic growth of capital-poor communities. OFC, by virtue of its mandate from OEO and its own self-ascribed planning objectives for 1975, has articulated its intensive effort to seek to leverage funds to help minority and community groups acquire and develop communications properties like cable television which serve their communities.

Above and beyond the individual mandates of these various entities, still broader federal policy (set by the White House Office of Telecommunications Policy) has recognized the need for rural cable development and the involvement of various federal agencies in supporting such development. Specifically, the 1974 Cabinet Committee on Cable Communications has stipulated within its policy recommendations the following:

"Recommendation: Governmental authorities should assure that basic cable or other broadband communications are available to residents of rural areas and to the poor.

Even though a majority of the homes in the United States may be wired for cable and cable may be providing programming and other information services in addition to retransmission of broadcast signals, many residents of outlying rural areas may not have the option of subscribing to cable. While it may eventually become economical for cable operators to extend facilities to these areas, this may be an instance in which sole reliance on the free market incentives of cable operators may not be adequate to meet certain national policy objectives, such as the widespread availability of information.

If this becomes a significant problem in the future, the Government should take affirmative action to assure a basic level of broadband communications service for residents of outlying rural areas. We recommend that the Secretary of Housing and Urban Development and the Secretary of Agriculture be directed to follow the development of cable in rural areas and make recommendations for such Government action as they deem appropriate."

The fact that rural communication needs have already become a significant concern is best illustrated by two Office of Telecommunications Policy sponsored studies on television distribution to rural areas conducted by the Denver Research Institute. One report indicates that more than one million -- or about 1.5 percent -- of the nation's households receive inadequate television service because they are located beyond the limits of even the closest stations, have no cable television system and aren't even served by a small "translator" system. In addition, nearly six million mainly rural households (about nine percent of U. S. households) do not receive adequate service on at least three channels and approximately 22 million households do not receive adequate service on at least five channels.

"Recommendation 12: Participation by minority groups in cable system ownership, operation and programming should be facilitated.

The development of cable represents a unique opportunity for minority, racial, and ethnic groups to become actively involved in a new communications medium. Minority groups not only should have employment opportunities, but also full opportunity to participate in all aspects of cable ownership, operation, and programming.

The general policy for the structure and regulation of the cable industry that we recommend would facilitate participation by all segments of society in cable ownership or control of channel use. Moreover, the local franchising authority should ensure opportunities for minority ownership and control in cable systems and programming.

At the Federal level, the Equal Employment Opportunity Commission should devote special attention to the development of the cable industry to assure ample employment opportunities for minority group members. We also recommend that the Office of Minority Business Enterprise and the Small Business Administration of the Department of Commerce be directed to give high priority to cable and to propose any necessary special provisions such as loan guarantees, to foster significant minority ownership or control of cable operations."

Large cable operations, like other new technologies have always been inclined to deliver their services to only the most lucrative markets. Thus, traditionally rural inhabitants have been the last to receive new technologies, such as electricity, telephones, and broadband communications. Following in this classic pattern, many minority, rural and small communities have been passed over the cable development. CRC's research into all towns with a sizable minority population, good market potential for cable, and no existing cable system, has identified over 105 cable ready communities in some 18 different states. CRC in its conceptualization of a National Rural Cable Development Task Force, has developed an overall strategy that can bring minority-owned cable to such communities.

5.2 Economic Analysis

In order to facilitate telecommunications' utilization as a stimulus to rural economic development one must take a close look at the economic factors involved. The rural sector's growth pattern and population mix is always affected as the economy reshuffles the economic opportunities open to rural people. The dynamics of the process are influenced by policy and, one hopes, policy is not immune to knowledge. But policy is often murky, and

there are decided gaps in our knowledge. Therefore, what is needed is to clarify policy choices and establish research priorities.

Much of rural economic development policy fails to concentrate on questions having to do with rural welfare economics and improvements in rural living. In both theory and practice, the task of determining the possibilities and choosing among them is a formidable one. In our social accounting we have no equivalent of the gross national product. We have no gross social product, and of course, no net social product. What we have is a mass of aggregate data and no way to digest it.

5.2.1 Objectives and Premises: No one is against improvements, provided they do not require giving up something else of value. This concept of optimality takes into account the benefits and costs in arriving at optimal decisions. This is clearly the correct analytic approach to illustrate improving rural living conditions with dynamic constraints. A rural growth model that maximizes a vector of objectives was generated in an attempt to develop an optimum mix. The objectives and premises are:

A. High Employment Level

A high level of employment is attained and maintained primarily as a result of national fiscal and monetary policies, not as a result of transitory program involvement.

B. Additional Income Streams

Even during high employment levels, the economy does not produce income streams at an optimum rate. Some resources are not used efficiently, and some investment opportunities with high rates of return are neglected. Some disequilibria represent unrealized opportunities to produce income streams. Rural people are especially vulnerable to these disequilibria.

- Because of their location and their pattern of employment, many rural people are unable to take advantage of job opportunities.

- Rural people are under a heavy educational disadvantage.

- Distortion in the use that is made of the factors of production in agriculture for reasons of public policy exact a high price in terms of foregone income streams.

C. Larger Size Distribution of Income

According to studies by Schultz and Kuznets on developed countries "in the more developed countries the size distribution of income among persons and families has become less unequal during the twentieth century." These changes in distribution appear to result from changes in functional income that are inherent in technological change. This indicates that autonomous technological change in the aggregate production function will increase functional income. In the aggregate, the relative size distribution of income in the U. S. has not changed substantially since World War II. This indicates that the inequity of low farm income distribution could be raised substantially by technological changes, including the broad infusion of telecommunications.

D. Higher Level of Schooling

It has been proven that increases in the formation of human capital relative to increases in the formation of non-human capital reduces inequalities in the distribution of personal income. Chiswick shows that the level of education has a measurable effect on North-South differences in inequality of incomes. To the extent that the rate of return on this form of human capital is as high as, or higher than, the rate on alternative investment opportunities, two objectives are achieved: the national product is increased, and inequality in personal income is reduced.

E. Equality of Farm Incomes

Economic analysis of the inequality of farm family incomes shows the following:

- Migration and multiple earners are among the strongest variables in reducing income inequality in the short run, whereas off farm work is strong in reducing long-run inequality.

- o Government payments contribute significantly to increasing the inequality of income.

- o If the capital going into agricultural production is increased without a proportionate increase in labor, an increase in long-run inequality of income results.

Accepting the Bureau of Census definition of rural people as those people who live in an open country or in villages having a population of 2,500 or less, the factors described above can be used to depict the effect of cable and other telecommunications technology on the growth potential of rural areas.

5.2.2 Rural Economic Growth and the Export Base Model: Both location theory and the theory of regional economic growth have described a typical sequence of stages through which regions move in the course of their development. This sequence is as follows:

1. Initially a self-sufficient subsistence economy with little investment and trade.

2. With improvements in transportation the region develops some trade and local specialization.

3. Region moves from cereal production, to fruit growing, dairy farming, and truck gardening.

4. With increased population and diminishing returns in agriculture and other extractive industries, a region is forced to industrialize. Industrialization means the introduction of secondary industries on a considerable scale.

5. The final stage of regional growth is reached when a region specializes in tertiary industries producing for export. Such a region exports capital, specialized human capital, and special services to less advanced regions.

Clearly the rural economy is stabilized in the third and fourth stages of development. There are constraints present that make the transition to industrialized economy very difficult. Enumerated they are: (1) the need

for greatly improved transportation facilities, which call for large-scale capital investments; (2) the need for intensification of the geographic division of labor; and (3) the fact that industrial technology is novel to an agricultural region. According to the theory of development and the constraints to industrialization, there is little growth potential in our rural economy. However, we take exception to this analysis for the contention that regions must industrialize to grow, as well as the contention that the development of secondary and tertiary industry as being difficult to achieve, are both based on some fundamental misconceptions.

If the region is focused on an export base, a great deal of secondary and tertiary industry will develop automatically either because of locational advantages of materials-oriented industry or as a passive reflection of growing income in the region resulting from the success of its exportable commodities. The decline of one exportable commodity must be accompanied by the growth of others, or a region will be left stranded. A historically important reason for the growth of new exports has been major developments in transport (in contrast with mere cost-reducing improvements in transport, which may reinforce dependence on existing exports), and communications. Such developments have often enabled a region to expand because of increased demand for its exportable commodities.

Communication development is a necessary vehicle for altering market demand curves. If an efficient link of communication were developed between the export base regions, the following would be a resultant:

1. There would be a tendency to a free market system. Because the underlying assumptions of consumer information is now violated we are consuming in an oligopolistic market.

2. Prices would decline as a function of increased output.

3. Consumer taste would be altered and/or modified, thus creating new export commodities and shifts in the market demand curves.

4. New demands would be served by new markets.

5. A pseudo agglomeration effect would create production efficiencies.

6. Higher levels of employment would result from output increases.

7. Regional income streams would be higher because of transaction money.

8. Specialization accompanied by higher training and skill levels would occur.

As these events prevail, new activities will evolve to satisfy local demand and to develop the export base.

Using the export base model with the inclusion of improvements in the communications link, there should be substantial growth accompanied by vast changes in the quality of life in the rural sector. The model focuses on optimizing the export sector of the rural economy; yet for the export sector to have any impact on growth, the demand for exports must cause a change in one of the factors, causing an expansion in the regional production possibilities curve. The transmission is through the demand for labor and capital. All of the inputs are related through the production functions. The demand for labor and capital, along with all the other inputs, is derived from the demand for final product. If the result of telecommunications development is an increase in final product, it would necessitate increases in labor and capital. Additional capital is financed through increased income streams. Labor, however, must experience a structural modification in the supply curve. This

modification is either extensive training, educational upgrading or labor input. It is the feasibility of the former that serves both in the optimization of the production function and in the increase of the quality of life.

Telecommunications could well serve as a vehicle for rural training programs. Regional institutions could be generated to train and educate the rural labor market. This feature is not only an optimization function, it represents efficiency in the production function. Telecommunications will also upgrade the aggregate education level, a primary factor in the quality of life.

Thus the theory of the export base model, when applied to rural growth and development, is a potentially accurate depiction of the economic growth of the rural sector, and telecommunications is an integral factor in that potential.

6.0 FINDINGS AND CONCLUSIONS

Telecommunications technology has been utilized in a wide range of demonstration activities calculated not only to test "new hardware" design but to assess the technology's service delivery potential. Most of this experimentation has been based in urban areas and has been dominated by projects focusing on the delivery of educational and health services. Only recently has there begun to develop a body of ideas and action in consideration of the impact service delivery through telecommunications as it specifically applies to rural areas. This study is an effort to assemble and review information regarding the potential impact of telecommunications technology upon rural America's economic development. The study has explored the thoughts of "informed experts"; reviewed existing sources of research information and demonstration projects; and analyzed federal legislation, research and agency interest.

The major issues and areas of concern addressed by the aggregated information source listed above and detailed in previous sections of this review must now be examined in terms of specific "findings and conclusions." As stated in the Preface of this report, the intent is to provide EDA and other federal agencies with working information which will assist in the determination of a national policy to influence the future direction of telecommunications research and development as it relates to the advancement of rural economic development.

The following body of information will enable EDA to focus more clearly on those facts that the investigating staff found as major issues. Therefore, our various analyses have led us to recognize and draw the following set of findings and conclusions:

1. There has been a significant number of projects designed to test the applicability of telecommunications technology to various aspects of community development. The majority of these demonstrations have centered on the delivery of health and educational services. While most of these experiments can be termed "successful" improving the ability of telecommunications technology to deliver those services effectively, few, if any, of the projects have focused specifically on their application to rural areas of the country. It is generally acknowledged that the delivery of community development services to rural areas poses particular sets of problems that have not been addressed by most telecommunications demonstration projects.

2. Several service areas falling under the general categories of social services (i.e. employment, economic/financial, political, etc.) and entertainment/recreation/cultural services have not been the subjects of significant demonstration programs in spite of : a) their recognized role in determining the quality of rural living conditions; b) the unique ability of telecommunications technologies to serve these areas; and c) the understood potential of these services (particularly entertainment) to play an important part in improved community economic development.

3. Most demonstrations have been carefully structured to prove the capability of telecommunications hardware. The extremely important area of cost benefits resulting from hardware installation and software program implementation has been largely unexplored on any substantive level. The economic analysis section of this study defined a major problem blocking the further development of effective cost benefit analysis as being the lack of social accounting system or measurement indicators incorporating quality of life factors.

4. The development and implementation of telecommunications technologies for overall community development as it applies to rural areas must be considered and evaluated on regional bases if the effect of these programs is to be maximized. Programs developed and coordinated on a regional level ultimately can have more impact both economically and socially for regional consideration will impart economies of scale to major demonstration programs which, in turn, will work to defray the capital costs of both hardware and software.

5. A significant number of demonstration programs to date have neglected the importance of software programming. It is essential to conducted research and demonstrations that specifically address software production based on articulated needs, systematized needs assessments, impact measurement, and evaluation of the development process. The production of effective software is vital to any meaningful assessment of telecommunications to meet rural economic development needs, both technologically and economically.

6. Telecommunications technologies effectively applied for rural development purposes can serve to increase the efficiency of government at all levels in their mandates to meet public needs in rural areas. This can be accomplished with programming to serve the public directly through specialized service delivery and with programming designed to impact upon internal administrative practices.

7. Experimental programs which prove effective for the implementation of telecommunications technologies in rural areas have a significant chance for wide application because our research indicated a generally high rate of acceptability of new technologies among rural residents.

8. The literature review in this study supported the contention

that much of the data in the telecommunications field is composed of proposals and planning studies; at best they are project descriptions of on-going efforts. Little, if anything, however, in the way of hard concrete findings or recommendations for the development of telecommunications in rural/remote areas was found. The results of the year long study by Robert Anthony on the "Impact of Cable TV on the Quality of Life in Rural Areas" commissioned by the Congressional Office of Technology Assessment, has yet to be released and many in government claim they do not wish to initiate new efforts before this study has been seen.

9. Generally, it must be noted that communications media are both comprehensive and pervasive as they apply to rural development: comprehensive in the sense of impacting on social, political, and economic structures because of its developmental reliance on local regulations, hardware and software availability and production, and community acceptance; pervasive in the sense that the communications media are able to cover as wide or narrow a target group as necessary for each program demonstration. The technology has the capability to be simple or highly complex and can evolve from one to the other easily. Therefore, telecommunications programs can be adapted to the availability of resources and can be altered to fit new technologies as they advance.

The "findings and conclusions" listed above are not radically new concepts. They have developed directly as a result of the research and analysis detailed in this preliminary review and they form the basis for specific program recommendations that are discussed in the following section of this report.

7.0 RECOMMENDATIONS

It is apparent from the data gathered for this report that the applications of telecommunications technology to rural economic development needs, up to now, have not been tremendously extensive nor has there been sufficient coordination or cross tabulation of data to determine which demonstrations, studies and experiments can be used in setting or establishing future federal guidelines in this area. There still exist a number of crucial questions beyond obvious technical considerations of what are the most appropriate telecommunications technologies for meeting rural needs and what needs are most adaptable to new telecommunications applications. The broader policy issues seem to be: what kind of positive action can be taken to ensure that rural areas benefit from such technologies now and not 20 years hence as experienced already in the historical pattern which has seen rural inhabitants become the last to receive electricity, telephone and broadcast communications services. Quite obviously, the private sector is not at present motivated to take such action. Thus another clear policy question is who should spearhead such development initiatives? And if the impetus should come from the federal government, then what course of action should be taken by what appropriate agency(s)?

Most important, national answers must be found to the question: What role must the federal government play in demonstrating the potential for rural development through telecommunications? And, what are the most efficient means for determining the best applications of telecommunications in rural environments?

The recommendations presented here take into account several important factors: legislative direction, regulatory change, multi-agency organization approach, regional focus, economic support alternatives and research initiatives relevant to these major questions surrounding telecommunications impact on rural development. Furthermore, both the conclusions and the recommendations included in the report are a serious attempt to match the needs of rural communities with the interest and present commitment shown by EDA. These recommendations also reflect a consensus of opinion between the interviews with "informed experts", the bibliographical findings, and BTW/CRC's earlier investigations. Hopefully, they will contribute to ways in which EDA might most effectively establish policy and guidelines for future directions in the area of telecommunications/rural economic development.

The recommendations are presented in four sections: Legislative, Regulatory, Public/Private Sector Involvement, and EDA's Role in Rural Telecommunications Development. It is suggested throughout that EDA might become the focal point around which activity in each of these areas could be generated. We feel that this is an appropriate and desirable posture for EDA to undertake at this juncture. Furthermore, it must be emphasized that positive economic change in the rural sector is not immediate, nor does it occur in the absence of development of the overall national economy. Rather, national priority must be given to designing innovative strategies for large-scale, long-term rural telecommunications development which, in turn, contribute to the overall productivity growth and development of the nation as a whole.

7.1 Legislative

It is our position that in the long-term, enabling legislation such as the proposed Telecommunications Technology Act of 1975 (H.R.9289) can greatly facilitate the establishment of a resource environment conducive to rural telecommunications development. However, there needs to be a more cohesive telecommunications legislative approach given to the construction of a basic policy foundation in order to significantly improve the quality of life for rural residents. Our specific recommendation is that EDA support such legislation at the federal level, and encourage complimentary state and local legislative activity, particularly in the designated EDA areas. Such encouragement could be in the form of increased information dissemination by EDA regional offices with regard to the types of local, state, and regional configurations that lend themselves most beneficially to rural telecommunications development; and identification of federal dollars that might become available for telecommunications development should rural jurisdictions indicate matching or supportive resources and activities.

7.2 Regulatory

In addition to appropriate legislative activity, a means should be developed for establishing low interest loans for the building of cost-effective telecommunications systems for the economic development of rural areas. Financing of such systems has been a major stumbling block and regulatory impediments have thwarted the ability of public and private entities to develop communications systems which were low in cost, yet with sufficient flexibility and ubiquity to provide the desired level of telecommunications service and coverage. BTW emphatically concurs with the recent

report from the Denver Research Institute which states, in part: "Local efforts to provide and finance expanded rural television service through integrated utilization of available technologies should not be discouraged by unwarranted regulatory impediments at the federal level. Accordingly, it would be appropriate for the Federal Communications Commission to reconsider its regulations insofar as they impact upon rural television delivery alternatives, including in such review a re-examination of the rules prohibiting the common operation or control of translators and cable systems, and the restriction on methods of signal relay to translators." Such changes would allow rural areas expanded use of these technologies and greatly lower the cost of hardware for rural telecommunications systems.

It is our recommendation that EDA adopt a position in favor of the above regulatory reconsiderations in light of its broader mandate to encourage cost-effective rural development schemes and maximize the quality of life of rural residents.

7.3 Public/Private Sector Involvement

Although pending and proposed legislation in the areas of telecommunications and rural economic development might greatly facilitate growth and revitalization of the rural sector, it is our broad recommendation that steps be taken to assiduously encourage local, state and federal agencies to fully exploit already existing opportunities for rural telecommunications.

BTW/CRC has cited in a previous recommendation a recent study which suggests regulatory changes that would be helpful in providing television services to presently unserved and underserved rural communities. In addition to regulatory changes, however, a more coordinated, comprehensive

approach to the design, installation, and utilization of telecommunications facilities by the public sector agencies involved in these communities is necessary. BTW/CRC has already taken a first step in this direction by establishing a National Rural Cable Task Force and has recently obtained an interagency agreement among EDA, FHA, SBA, and OMBE, to work in a cooperative effort to bring about improved rural communications and the increased development potential that such communications imply. (See Appendix E)

For the private and philanthropic sectors, such coordinated effort is equally important. The incentive for the cable industry is historical and apparent. However, construction, financing, especially for rural, sparsely-populated areas, has often been difficult to obtain. Foundations, on the other hand, have traditionally been interested in the more exotic aspects of telecommunications technology and service delivery, and for a variety of reasons, have looked at technological feasibility and human factors to a greater extent than the broader economic ramifications. Furthermore, they have not especially paid attention to the rural areas, with the notable exception of the health care field.

While we are not condemning prior efforts by government, industry, or the philanthropic community, we do feel that more direct federal involvement, spearheaded by EDA will go a long way toward making the interest of others in rural telecommunications more manifest and the aggregate effect of their individual and joint activities more widely felt.

7.4 EDA's Role in Rural Telecommunications Development

As stated previously, EDA has a unique opportunity to establish the forefront of federal involvement in the use of telecommunications for rural economic development. It is recommended that EDA exploit this opportunity

in two ways: first, EDA should involve all other interested agencies in the government in an effort to coordinate and maximize government involvement in telecommunications/rural development. This would take the form of increased information exchange, specific interagency project efforts, and internal and contracted research on the economic impact and implications of various telecommunications service delivery schemes. Second, EDA should embark upon a program of long-term demonstrations that can measure the impact of telecommunications technology on rural economies. Such demonstrations are especially timely, since the field of study investigating telecommunications applications for the service delivery in urban areas, with the exception of cost-benefit analyses, has been researched in component parts for the last several years. However, an integration of these component studies forming a total systems approach and adapted to a specific rural sector, could form the basis for actual demonstration projects to test the theories involved in order to ascertain their applicability to the rural environment.

The lack of definitive studies projecting the cost-benefit of telecommunications systems or evaluative data about cost-benefit for those demonstrations conducted, points to a major void in telecommunications research. EDA can fill this void. The impact of such EDA demonstrations would be further maximized by the use of a task-team approach that combines members from local citizens groups, local, state and regional governments, local education and economic development institutions, with other federal resource organizations and multi-disciplined telecommunications resource persons.

EDA's unique contribution to the field would be its focus on the economic development aspect of resource allocation for telecommunications, as well as its emphasis on changes in the quality of life of rural residents as measured by direct and indirect economic benefits.

APPENDICES

A. Resource Bibliography on Telecommunications and Rural Development with Selected Annotations

B. List of Informed Experts

C. Question Format

D. Abstracts of the New Rural Society Project Reports

E. Interagency Rural Cable Agreement

F. BTW/CRC Organization Brochure

APPENDIX A

RESOURCE BIBLIOGRAPHY ON TELECOMMUNICATIONS AND RURAL DEVELOPMENT WITH SELECTED ANNOTATIONS

BIBLIOGRAPHICAL OVERVIEW

The literature treating the field of "telecommunications and rural development" was found to be highly fragmented; lacking in focus, direction, and depth, and conspicously low in volume. Much of what has been included in this bibliography represents material discovered under the broad terminology of "Telecommunications/Technology", and "Rural/Economic and community Development." Very little material was found in the published literature prior to 1975 on the impact (potential or demonstrated) of telecommunications technologies upon the economic development of rural areas.

An analysis of the citations included in this bibliography reveals that 125 citations were selected for includion, and that of this total:

General Technology

- 34 citations could be classified under the broad subject heading "General Technology." Within such a category would be those works regarded as basic or key to a general understanding of cable and other related telecommunications technologies; also included here are those studies and reports which deal with technological applications to urban problems, but have some transfer potential for rural applications or adaptations. We have also included under this heading the basic "communication/travel substitutability: studies which focus on economic implications of reducing the need to travel for anyone in either a rural or urban environment.

Community/Economic Development

- 32 citations could be regarded as primarily "community/ economic development" related. These citations reflect the literature concerned with potential for the development of rural areas; ideas and issues confronting minorities and local community developers, and the question of municipal/ public ownership in economic development.

Health/Education

- 36 citations deal with the broad areas of "Education & Health" in the delivery of social services via telecommunications technology

Social Services Delivery

- 15 citations found deal with a broader definition of "social services delivery" (outside of health and education) with particular implications for the improvement of the quality of rural life.

Information Services

- 14 citations in the bibliography are concerned essentially with the provision of information services. Areas covered include: "the social potential of information technology;" "Interconnection of libraries via satellite," and "the planning of broad community information utilities."

Interfacing Technology

- 26 citations treat the subject of "interfacing technologies." Several of these studies focus on the cost benefits derived from linking several different technologies to form an efficient system for the delivery of vital services to rural areas.

The list of resource centers and organizations included in this bibliography is not meant to represent the total resource for technical assistance and information in the area of telecommunications and rural development, but does represent those organizations the staff of BTW/CRC has worked with in this area.